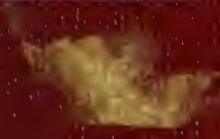


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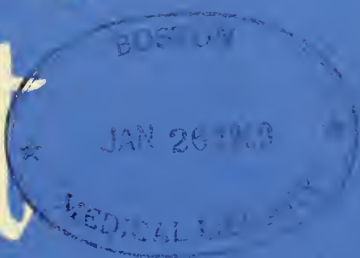
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JANUARY 1959

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COMING in *February* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Until comparatively recently, the fibula was seldom used as a stabilizing mechanism in the control of fractures of the lower part of the tibia. E. Harvey O'Phelan, M.D., of the University of Minnesota, describes this procedure in the paper "Stabilization of Comminuted Lower Tibial Fractures by Fixation of the Fibula," which is the second article to appear in the new fracture series. By stabilizing the fibula, the adjacent tibial structures can be normally aligned, and firm fixation of these structures permits repeated surgical measures, including skin grafting.

- In spite of the mass immunization programs that have been put into practice in the United States during the last thirty years, whooping cough continues to cause many deaths in infancy. Included in this issue in the series on communicable diseases is the article entitled "Pertussis" by James V. Miles, M.D., of Jamestown, North Dakota. The paper is primarily concerned with the unusual aspects of the disease, the atypical picture it produces, and the factors that may contribute to its evolution.

- In the article "Pterygium Syndrome (Status Bonnevie-Ullrich)" by Reza Gharib, M.D., and Gunnar B. Stickler, M.D., of the Mayo Clinic, the various congenital malformations comprising this syndrome are discussed. The case of a patient with abnormalities characteristic of the pterygium syndrome is described: namely, webbed neck, multiple telangiectatic spots, eventration of the diaphragm, dislocated left hip, and arthrogryposis multiplex.

- An extensive review of the literature on melanomas is presented by Joseph W. St. Geme, Jr., M.D., of Minneapolis, in his paper "Of Melanin and Melanomas." Various types of pigmented nevi, which are usually believed to be the precursor of malignant melanomas, are described. The diagnosis and treatment of the systematic varieties of melanomatosis are considered, and an entire section is devoted to the diagnostic and therapeutic problems attendant to the most common site of melanomas — the skin. Also included is a discussion of the problems posed by the occurrence of melanomatosis during childhood and pregnancy.

Meetings and Announcements

UNIVERSITY OF MINNESOTA MEDICAL CONTINUATION COURSES

January 22-24—Surgery for Surgeons

February 23-25—Cardiovascular Diseases for General Physicians

March 2-4 — Pediatrics for General Physicians

March 14—Trauma for General Physicians

March 16-18—Internal Medicine for Internists

March 30-April 3—Basic Concepts of Water and Electrolyte Balance for General Physicians

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

ALLERGISTS' COURSE

The American College of Allergists Graduate Instructional Course and Annual Congress will be held March 15 to 20 at the Mark Hopkins Hotel, San Francisco. Those interested should contact John D. Gillaspie, M.D., Treasurer, 2049 Broadway, Boulder, Colorado.

COURSE ON DISEASES OF THE CHEST

The annual postgraduate course on Diseases of the Chest will be given March 30 through April 3 at the Sheraton Hotel, Philadelphia. Most recent advances in diagnosis and treatment of heart and lung diseases will be presented. Tuition, including luncheon meetings, is \$100. For further information, write the Executive Director, American College of Chest Physicians, 112 E. Chestnut St., Chicago 11.

CLINICAL REVIEWS

Staff members of the Mayo Clinic and Mayo Foundation for Medical Education and Research will again present a program of lectures and discussions on problems of current interest in general medicine and surgery on April 13, 14, and 15. Members of the American Academy of General Practice are entitled to twenty-one hours of Category I credit. There are no fees, but accommodations are limited. Those wishing to attend should communicate with the Clinical Reviews Committee, Mayo Clinic.

Investigator

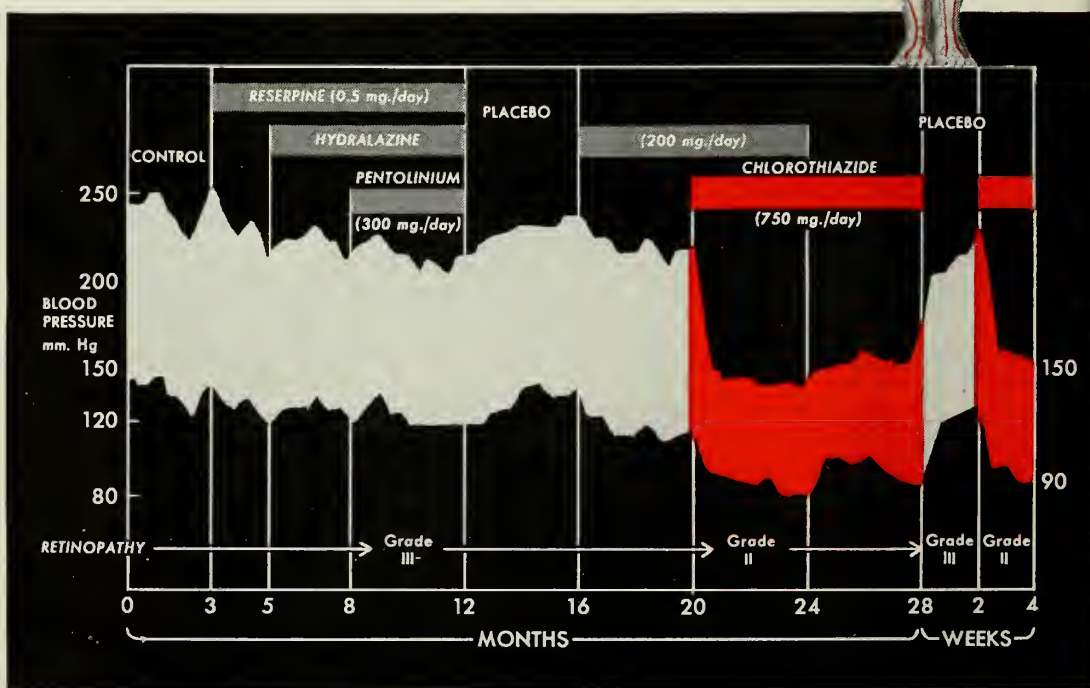
after investigator reports

Wilkins, R. W.: New England J. Med. 257:1026, Nov. 21, 1957.

"Chlorothiazide added to other antihypertensive drugs reduced the blood pressure in 19 of 23 hypertensive patients." "All of 11 hypertension subjects in whom splanchnicectomy had been performed had a striking blood pressure response to oral administration of chlorothiazide." "... it is not hypotensive in normotensive patients with congestive heart failure, in whom it is markedly diuretic; it is hypotensive in both compensated and decompensated hypertensive patients (in the former without congestive heart failure, it is not markedly diuretic, whereas in the latter in congestive heart failure, it is markedly diuretic). . . ."

Freis, E. D., Wanko, A., Wilson, I. H. and Parrish, A. E.: J.A.M.A. 166:137, Jan. 11, 1958.

"Chlorothiazide (maintenance dose, 0.5 Gm. twice daily) added to the regimen of 73 ambulatory hypertensive patients who were receiving other antihypertensive drugs as well caused an additional reduction [16%] of blood pressure." "The advantages of chlorothiazide were (1) significant antihypertensive effect in a high percentage of patients, particularly when combined with other agents, (2) absence of significant side effects or toxicity in the dosages used, (3) absence of tolerance (at least thus far), and (4) effectiveness with simple 'rule of thumb' oral dosage schedules."



In "Chlorothiazide. A New Type of Drug for the Treatment of Arterial Hypertension,"

Hollander, W. and Wilkins, R. W.: Boston Med. Quart. 8: 1, September, 1957.

MERCK SHARP & DOHME Division of MERCK & CO., Inc., Philadelphia 1, Pa.



Introduction to a Series of Articles on Fractures and Related Trauma

JOHN H. MOE, M.D.

THE PAST DECADE has seen a decided surge of interest in problems associated with trauma. Medical schools are somewhat belatedly recognizing that the number of hospital admissions of patients who have acute injuries or disabilities originating in trauma comprise a substantial percentage of all hospital admissions. Undergraduate training in medical schools throughout the country are devoting more time to the teaching of trauma and the problems associated therewith.

No small part of the general picture of trauma is concerned with fractures and other orthopedic problems. It is the intent of the authors of this series of articles, which begin in this issue of THE JOURNAL-LANCET, to call the orthopedic problems associated with the management of trauma to the attention of the practitioner. From time to time, it is also planned to include articles having to do with general surgical, urological, and neurosurgical aspects of the problem. Rehabilitation of the injured patient will also be included.

Prevention and Treatment of Infections in Bone

JOHN H. MOE, M.D.

Minneapolis, Minnesota

THE SPECTER OF BONE INFECTION has always haunted the surgeons who, through choice or circumstance, deal with surgery of the skeleton. "Once an osteomyelitis, always an osteomyelitis," was a phrase much used in years past.

In the earlier 1930's when I first began to practice orthopedic surgery, the children's wards held many cases of chronic osteomyelitis of hematogenous origin as well as those due to primary bone infection. With the advent of chemotherapy and antibiotics, the number of these patients dropped rather spectacularly, and, for awhile, there was hope that osteomyelitis might be eventually eliminated both as a blood-borne infection and as a surgical complication of bone operations and fractures. Unfortunately, no such utopian state has materialized. In fact, recently, because of increasing numbers of infections due to staphylococci resistant to antibiotics, there is increasing alarm concerning the numerous bone and soft tissue infections encountered in hospital practice.

In the false and often blind dependency upon antibiotics which became prevalent during the past several years, sound surgical principles in preventing and treating wound infections were often forgotten. It is time that we reappraise our surgical judgment and technics.

Compound or open fractures occur in ever increasing numbers in these days of rapid travel. In addition, most orthopedic surgeons have shown less hesitation to do open reductions and internal fixations of fractures. This teaching among trained bone surgeons has spread to those less qualified to do open bone surgery.

JOHN H. MOE is clinical professor and director of the Division of Orthopedic Surgery at the University of Minnesota.

The morbidity and expense associated with infections in bone may not be fully appreciated. Recovery is often poor, healing may take months, and recurrences are prone to occur. Amputation of an infected extremity is not uncommon.

The following case report illustrates an uncontrollable infection.

Mrs. W. M., age 48, sustained a very comminuted fracture of her right lower femur in an automobile accident in March 1954. The accident occurred in New Mexico, and the choice of treatment was open reduction and internal fixation with a nail and plate combination. She was transferred to her home town in Minnesota where her family doctor noted evidence of wound infection in spite of large daily doses of antibiotics. Because of continued pain, swelling, and mild drainage, she was transferred to Minneapolis. Her sedimentation rate was over 100, her temperature ranged to 101° F., and she appeared toxic. The operative wound was opened, and evidence of purulent osteomyelitis was found. The fracture appeared to be healing somewhat. The plate and screws were removed, and the wound was debrided of grossly infected and necrotic tissue and was packed open. In transferring the patient onto a fracture table for the application of a spica cast, the fragments separated and displaced. A spica cast was applied. Irrigation through a catheter of neomycin solution was instituted. Because of the extensive osteomyelitis and poor prognosis, amputation through the middle of the thigh was advised, but this recommendation was refused by the patient.

From March of 1954 until March of 1955, numerous attempts were made to control the infection without amputation. Rush pins were inserted ten days after the initial debridement and removal of plate and screws. The wound did not become clean, and pocketing and spread of purulent material occurred proximally. A high-thigh amputation was finally performed with the patient's consent but proved inadequate, and a disarticulation of the hip became necessary to finally control the infection. A sequestrum formed, and final healing occurred after its removal in 1956.

The severe infection was further complicated by a psychosis which responded to shock therapy.

Instances of dormant wound infections have occurred from time to time in our experience,

no doubt because of initial antibiotic therapy. In one such instance, a severely comminuted fracture of the upper third of the femur was treated by open reduction and internal fixation with a very long Moe plate. Wound healing occurred per primam, although the temperature was elevated postoperatively. The patient was discharged and returned two months later with drainage from the wound. Exuberant granulations were found when the wound was reopened and there was some evidence of healing of the more comminuted upper portion of the fracture. An intramedullary nail of the Hanson-Street type was substituted for the plate and screws, and the wound was treated by debridement of necrotic tissue, open packing, irrigation with antibiotics, and subsequent secondary closure. After three repetitions of this surgical procedure, the wound remained closed and infection finally subsided, although, during the course of treatment, amputation had been considered. Bone healing finally became solid, and the patient has been rehabilitated and returned to work as a bank executive with the intramedullary nail still in place.

It has been my experience that plate and screw fixation does not serve as a satisfactory method of fixation in the presence of osteomyelitis. The screws loosen, the drill holes become filled with granulation tissue, and the bone becomes necrotic under the plate. In cases of wound infection involving the bone, such plate and screw fixation should be removed when the wound is opened and debrided, and intramedullary fixation should be substituted if internal fixation is necessary.

Satisfactory outcome of a severely infected femur fracture is illustrated by the somewhat detailed narration of the following case history.

C.K., age 32, suffered a comminuted fracture of his left femur while water skiing on August 22, 1952 (figure 1). This accident occurred in a small community in northern Minnesota. An orthopedic consultant came to the small town and performed an open reduction with double plate fixation. No postoperative external fixation was used (figure 2). An elevated temperature and wound drainage were noted postoperatively. He was transferred to Minneapolis under the care of his family doctor.

Approximately six weeks after the accident, the femur broke spontaneously at the fracture site while the patient was getting out of bed (figure 3). Varying amounts of purulent drainage had been present from the operative wound ever since the initial operation, and the temperature pattern had shown a moderate septic course.

When asked to see and treat the patient, we embarked on a program which first involved removal of the plate and screws and wound debridement. This procedure was followed by packing the wound and irrigating it, while maintaining position of the fracture by traction in suspension. Second, an intramedullary nail was inserted after a week and open packing and irrigation



Fig. 1. August 22, 1952. C.K., age 32, suffered a comminuted closed fracture of the left femur in a water skiing mishap. Treatment in local hospital was by open reduction and internal fixation by two 6-hole plates and screws.



Fig. 2. Comminution of fragments plus inadequate length of plates available prevented secure fixation. However, he was allowed to be without external support. Mild wound infection was present. Patient was nonetheless allowed up on crutches without external support.



Fig. 3. Six weeks later the femur refractured. Infection and drainage were now severe.

were continued for an additional week. A secondary closure was then performed. Although it was not possible to obtain rapid closure, this general outline of treatment proved to be satisfactory (figure 4).

On October 8, 1952, six weeks after the initial fracture, the plates and screws were removed, the area debrided, and the wound packed open. Counter drainage in a dependent area was instituted and the leg placed in traction. Catheter irrigation with neomycin solution was carried out continuously.

On October 16, 1952, a Hanson-Street intramedullary nail was inserted and the wound again packed open with continuous irrigation. The wound appeared clean.

As of November 10, 1952, the leg was edematous, and purulent drainage was still present. The wound was reopened and repacked. The patient was placed in a spica cast.

On December 15, 1952, he was discharged to his home. Some mental despondency was noted.

On February 6, 1953, the cast was changed. The leg was still somewhat edematous. An ischial weight-bearing Caliper brace was ordered. Mild drainage continued. Sequestration of dead bone at the fracture site was noted on x-ray.

On March 10, 1953, a sequestrectomy was performed. The wound was again packed open and irrigated with neomycin solution.

On March 21, 1953, the patient was again discharged to his home. Mild drainage still persisted.

By April 10, 1953, all drainage had stopped.

On October 31, 1957, the Hanson-Street nail was removed, since the union was solid and there was no evidence of recurrence of infection (figures 5 and 6).

The surgical principles involved in the man-



Fig. 4. Treatment consisted of wide exposure and debridement of the wound of all dead tissue. Some bone was removed. Internal fixation was carried out by an intramedullary nail, and the wound was packed open and irrigated with saline and antibiotics. Specific antibiotics were given systematically. Subsequently, secondary closure was successful in obtaining soft tissue coverage with minimal drainage from a small sequestrum visible two months later. Fracture is now beginning to heal. Wound healed after sequestrectomy.

agement of this patient include the following important points:

1. The initial operation had been performed in surroundings unfamiliar to the consulting orthopedic surgeon and with an inadequate armamentarium of equipment. The record indicates that over four and one-half hours were spent in obtaining reduction and internal fixation. *Excessive operating time in operative open reduction of fractures invites infection.*

2. The use of plates and screws without external fixation provides inadequate internal fixation in comminuted fractures of the long bones and especially of the femur.

3. Wound infections in open fracture surgery should not be treated expectantly.

4. The surgical principles of complete exposure of the infected area, eradication of the



Fig. 5. A year later the wound was healed, and bony union of the fracture was consolidating.

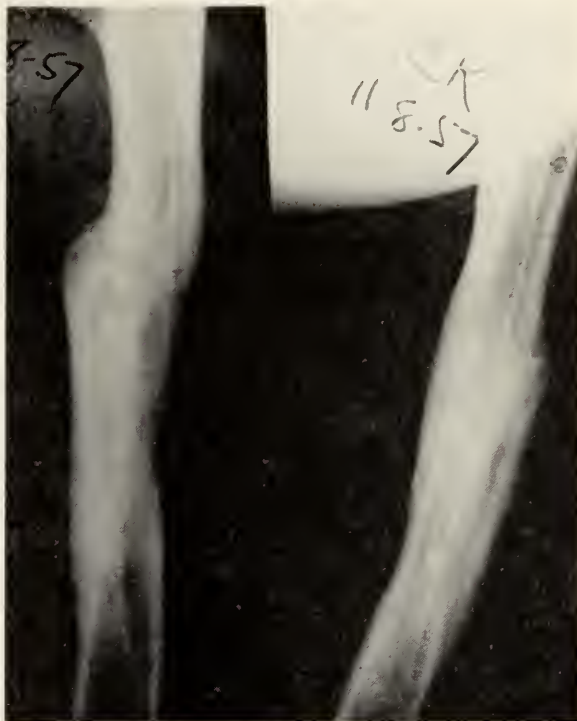


Fig. 6. Five years later, the intramedullary nail had been removed, and the fracture was firmly united.

grossly necrotic tissue, removal of all plates and screws, and open packing of the wound for easy dependent drainage are sound. Maintaining position of the fracture fragments and the institution of specific antibiotic medication both locally and systemically are also of importance.

5. The optimum time for secondary closure is approximately five to ten days. If initial debridement has been adequate and if the wound has been kept widely open and packed, it will usually be clean and free of pocketed purulent material at that time. In this illustrative case report, unrecognized necrotic bone fragments did not permit such secondary closure to be successfully accomplished.

6. When secondary closure is done, the wound must be completely obliterated of dead space. Avascular scar tissue must be excised, and live muscle or flaps of skin and subcutaneous tissue must be used to eliminate such dead spaces.

7. Intramedullary nail fixation can be instituted in the presence of infection without hazard. On the other hand, plates and screws are not well tolerated.

8. When bone sequestrates, the necrotic portion must be removed.

9. Bone healing and regeneration will occur in the presence of infection of the fracture if properly handled.

The prevention of infection in compound fracture wounds is directly related to the initial care given the wound. By proper decontamination of the wound, all fresh compound fractures should theoretically heal per primam. It is of great importance to recall that fresh compound wounds are merely contaminated with dirt and bacteria which can be removed by mechanical cleansing. After eight or more hours have elapsed, it may be assumed that the bacteria have begun to multiply and invade the tissues and that mechanical cleansing will not remove them.

Initially, the patient's general condition must be taken into account. The first care of the wound should preferably take place in proper operating room surroundings with the patient anesthetized. Patients in deep shock from blood loss or severe multiple injuries must be given appropriate treatment for their general condition. In severe crush injuries, the incidence of toxic nephrosis with subsequent kidney shutdown must be kept in mind. It is well to insert a catheter into the urinary bladder in all such severely injured patients to obtain information regarding both bladder and kidney injuries and to ascertain the patient's urinary output.

In caring for the wound, the first step is to cover it with a substantial pad of sterile gauze

while the whole surrounding area of skin is thoroughly cleansed and made surgically clean. It must not be forgotten that dirty fingernails and toenails in an operative field invite infection. All dirt and hair in the area to be surgically exposed must be removed. Soap or detergent, with or without hexachlorophene; a scrub brush and nail file for nails and deeply ingrained dirty skin; and ether or other solvent for tar should all be used, never allowing any dirty water to enter the wound itself. Preferably, the surgeon should do this himself unless very expert help is available.

Second, after the wide surrounding area is surgically clean and has been painted with an antiseptic, the gauze covering the wound itself is removed, and with fresh sterile instruments and with the surgeon in gown and gloves, the wound itself is cleansed. A sterile debridement tray consisting of an open large pan covered with screen and having a drainage spout and hose is placed under the extremity to be cleansed. From an overhead sterile canister connected to the surgeon by a tube and nozzle, saline is used in large amounts to wash out the wound. Soap or detergent is generously applied. Ether is used to cleanse the ends of the bone contaminated with tar. A scrub brush may be necessary. Dirt deeply embedded in the bone may require removal with a curet, rongeur, or osteotome.

During this initial decontamination of the wound, the following procedures are important:

1. Removal of hair from the wound margins by a sterile razor.

2. Excision of devitalized skin margins as necessary. Caution should be exercised in regard to trimming the skin margins, for cut skin is contracted, and it is easy to remove skin so generously that closure will become a problem.

3. The wound should be opened by extending the incision so that the whole of the fracture site becomes accessible.

4. No large fragments of bone should be removed even if a fragment is free. All bone fragments should be thoroughly decontaminated and replaced.

Having spent a considerable period of time in thus removing all gross wound contamination, the whole operative area is again prepared surgically and redraped. The working team now puts on fresh sterile apparel and sets up a new working table. An unused debridement tray and instruments are used, for the wound is now considered surgically clean and ready for final definitive treatment.

Copious amounts of saline irrigation further cleanse the tissues, and such irrigation helps

the surgeon determine the viability of tissue. These procedures should not be done under tourniquet, for bleeding from muscle is used as a criterion for viability. All nonviable tissue is cleanly excised. All corners of the wound are again cleansed.

Whether or not to internally fix the fracture depends on circumstances. A firmly fixed fracture is less prone to infection. On the other hand, metal in the wound constitutes a foreign body. One factor must be weighed against the other. In fractures of the leg or forearm, stabilization may be achieved by internal fixation of the other bone which may not be involved in the open wound.

Fractures several hours old and severely contaminated should not be internally fixed. Intramedullary fixation is probably the safest. When deemed necessary, the author does not hesitate to internally fix fresh open fractures which have been adequately decontaminated.

Only wounds which are very fresh and very thoroughly cleansed should be closed primarily, and such closure must be done without tension. Relaxing incisions may be necessary in order to achieve closure without tension.

All wounds several hours old and those which are doubtfully clean should be packed open with fine mesh gauze and secondarily closed five to seven days later. External support to the fracture by cast or suspended splinting should always be given.

Occasionally, in older or debilitated patients, metabolic disturbances are found which are accompanied by lowering of the serum proteins, often with a reversal of the albumin-globulin ratio. Such metabolic abnormalities markedly lower the patient's resistance to infection, and, when suspected or diagnosed, every effort should immediately be made to restore the proteins as well as the electrolytes to normal. No elective surgery should ever be carried out in the presence of such abnormalities.

The circulatory status of the extremity is of great importance. Exposed major vessels often are in spasm, jeopardizing the entire extremity, and every available means should be used to reopen such constricted arteries. Bathing them in Novocain solution, injecting papaverine into the artery proximal to the spasm, and sympathetic blocks to the involved extremity all are helpful measures. As a last resort, the total excision of the portion of the artery in spasm often relieves the associated spasm in the collateral circulation and permits re-establishment of the blood supply through these collaterals. One should not hesitate to do a vein graft if indicated.

All open fractures are potentially contaminated with tetanus and gas bacilli. Patients with previous active immunization to tetanus who have received a booster injection within five years of the presenting injury should receive another booster dose of fluid tetanus toxoid. If their period has been longer than five years and in those with severely crushed wounds, 1,500 units or more of tetanus antitoxin should be given in addition, unless the patient is very sensitive to antitoxin.

Unimmunized patients should receive tetanus antitoxin in doses of 1,500 to 3,000 units or more plus tetanus toxoid.

All patients who receive tetanus antitoxin should be tested for sensitivity by intradermal injection of .02 cc. of 1:10 or 1:100 dilution of the antitoxin. Sensitive patients must be desensitized by repeated small subcutaneous injections of antitoxin repeated at intervals, while sensitization is controlled by continuous intravenous drip of Benadryl, ACTH, and epinephrine.

Prevention of gas bacillus infection is directly related to the thoroughness with which the wound is cleansed and to strict adherence to the rule that a doubtfully clean wound should not be closed *per primam*. Prophylactic antitoxin is of very doubtful value.

PREPARATION OF THE SKIN IN BONE SURGERY

All surgical procedures in bone should be done through skin which is clean and healthy. The operative area deserves the same care that is given to the surgeon's hands.

Hair should not be removed from the operative area with a razor the night before for fear of inflicting skin cuts which will be contaminated. This procedure should be done the morning of surgery by clipping and shaving. Ample time should be spent in thoroughly washing the skin of the operative site with soap or detergent. Previous daily washing of the operative area using soap or detergent containing hexachlorophene has been shown to lower the skin bacterial count. No elective bone surgery should be done in the presence of small infections in the skin of the operative area or in the presence of definite infections elsewhere in the body.

A potent source of skin contamination lies in the dirty skin under a cast which has been worn for a long time. In any elective bone surgery, casts should be removed several days in advance and the intervening time spent in thoroughly removing all dead skin, crusting, and other contaminated debris.

It is important to drape the extremity in a

way that will allow unrestricted manipulation without fear of exposing unclean skin areas.

At present, all large hospitals are concerned about the prevalence of resistant staphylococci contaminating surgical wounds. Most city hospital administrators and their personnel are taking steps toward better control of infections within their hospitals. The following is a summary of current opinion aimed toward such control:

1. Unnecessary use of antibiotics is to be avoided. Use of routine postoperative antibiotics is not indicated.

2. Laundry and blankets should not be used for more than one patient without making sure they have been sterilized.

3. Mattresses should be sterilized by washing waterproof mattress covers with antiseptic.

4. Appropriate means should be employed to sterilize material used interchangeably between patients, such as x-ray tables, electrocardiograph electrodes, food trays, cast cutting equipment, cast carts, dressing trays, and carts.

5. Strict isolation technic must be maintained for all infected cases on the floor. Dressings on all such cases must not be changed without gown, gloves, and mask. Doctors and nurses must avoid contamination of clothing.

6. All operating room suits and shoes should remain within the operating room area. Trips to the floor in operating room apparel are to be avoided. Shoe soles should be soaked in antiseptic before entering the operating room proper. No one should be allowed in the operating room area in street clothes and shoes.

7. A longer hand scrub for doctors and nurses is recommended.

8. The skin of the patient's operative area must be adequately prepared.

9. Adequate masks must be worn over the nose and mouth and be changed frequently.

10. *All infections occurring postoperatively must be reported.*

11. An active functioning committee should be formed to receive all reports of infections and to make a study of each of them.

SUMMARY AND CONCLUSIONS

The prevention and control of infections in bone as well as in soft tissue in hospitalized patients requires constant vigilance and good surgical judgment.

Team work on the part of the doctors, nurses, and personnel is of the utmost importance. The salient features of a program directed toward eradicating infections are outlined in this presentation.

Digitalis: Its Use and Abuse

Literature Review

N. MALCOLM BALOTIN, Ph.D.

Collingswood, New Jersey

DIGITALIS IS THE DRUG OF CHOICE in some cardiac abnormalities associated with a presenting or impending diminution in stroke volume. Maximum benefits can be attained only with a clear understanding of digitalis pharmacology, its indications and limitations, as well as the contraindications. One must likewise be intimately familiar with several of the preparations available and their toxic manifestations in overdigitalization.

PHARMACOLOGY¹⁻⁴

Digitalis increases the force of myocardial contraction. The ventricles empty more completely, length of systole is decreased with improvement in diastolic filling, and venous pressure is reduced. There is a decrease in diastolic size and an increase in the mechanical efficiency of each contraction, both factors decreasing the oxygen need of the heart for a given amount of work. This is a reversal of the basic energy disturbance in myocardial failure.

Digitalis decreases cardiac rate in tachycardias due to heart failure. This is accomplished by a reduction in venous pressure following the more efficient emptying of the heart, thus abolishing the Bainbridge reflex. In individuals with normal sinus rhythm, with or without congestive heart failure, full doses of digitalis cause only insignificant and inconstant changes in rate, and beneficial effects are frequently observed in cases of failure without any evidence of cardiac slowing.

Digitalis decreases or impairs conduction of impulses from the atrium to the ventricle by direct action on the junctional conduction tissue and, to a lesser extent, by vagal stimulation. This action is of primary importance in uncomplicated atrial arrhythmias.

Digitalis is not a true diuretic; its effects on renal blood flow and glomerular filtration are thought to be entirely the result of its improvement in cardiac output and the circulation.

INDICATIONS

The primary indications for digitalis therapy are right or left congestive heart failure, or a combination of both, resulting from a defective myocardium, the inefficiency of excessive ventricular rate, or a combination of the two.^{3,4} In this syndrome, a progressively deteriorating cycle is established, which is shown in figure 1.⁵ This cycle may be broken by digitalis through the improvement of stroke volume, thus increasing renal circulation, effecting diuresis, decreasing blood volume and venous congestion, and, consequently, decreasing the demand on the heart. Once the heart is compensated, continued use of digitalis does much to prevent the recurrence of heart failure. The best results are obtained in hypertensive or arteriosclerotic heart failure.

In atrial fibrillation, 400 or more impulses per minute are impinging on the atrioventricular bundle. The bundle cannot conduct more than 270 impulses per minute; furthermore, many of the impulses arrive during the refractory period of the ventricle and are ineffective. Nevertheless, the ventricle responds with 100 to 160 contractions per minute. These contractions are less efficient than normal. The tachycardia diminishes the diastolic recovery period, since many impulses arrive before adequate filling has occurred. By increasing the refractory period of the atrioventricular bundle, digitalis decreases the frequency of impulses bombarding the ventricle and thereby slows its rate.¹⁻³

Digitalis exerts its most dramatic action in combined atrial fibrillation and congestive heart failure. In such cases, an increase in the refractory period due to a more forceful contraction is more important than impaired atrioventricular conduction in slowing the ventricular rate.

In myocardial infarction, digitalis is of benefit only in case of subsequent congestive heart failure arising from excessive strain on the remaining intact musculature. It will not rupture the weak, infarcted muscle; this danger implies that digitalis increases the intraventricular pressure. On the contrary, an increased intraventricular

N. MALCOLM BALOTIN will graduate from Jefferson Medical College, Philadelphia, in June 1959.

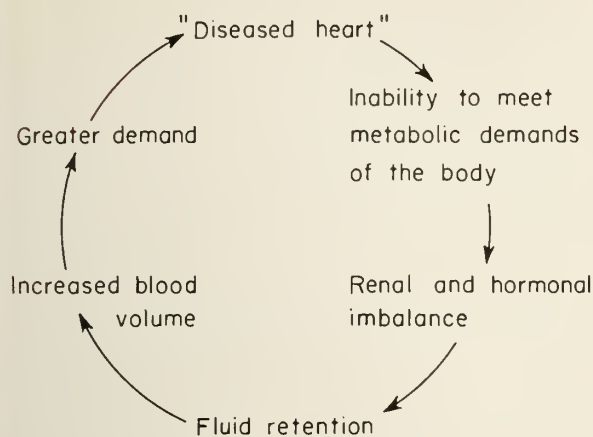


Fig. 1. Progressively deteriorating cycle.

pressure is produced not by digitalis but by cardiac failure. Atrial fibrillation develops in approximately 8 per cent of these patients. This arrhythmia frequently disappears in a few days with, and often without, quinidine treatment. If the ventricular rate is rapid, digitalization is required. The normal sinus rhythm is usually restored within a few days, if not after the first dose. The danger of systemic emboli from atrial thrombi after the conversion is negligible and should not interfere with treatment.^{2,4}

Digitalis is of value in some other arrhythmias characterized by a rapid ventricular rate, that is, atrial flutter, paroxysmal atrial or ventricular tachycardia, and ventricular premature beats. In atrial flutter, the rapid ventricular rate may be reduced by decreasing the ratio of ventricular to atrial beats, or the flutter may be converted to atrial fibrillation with a more readily controlled ventricular rate. Sometimes, fibrillation reverts to normal after the digitalis has been discontinued, especially with the aid of quinidine.

Atrial paroxysmal tachycardia can be stopped in about 50 per cent of the cases by carotid pressure or one of the other vagal reflexes. If none of these is effective, the best form of treatment is a rapidly acting digitalis preparation. Application of the various vagal reflexes at the height of the digitalis effect is now often successful.⁶

Ventricular paroxysmal tachycardia is an emergency, leading to a mortality of about 50 per cent of cases because of ventricular fibrillation, shock, or cardiac exhaustion. In those cases failing to respond to quinidine or procaine amide, digitalis may be of benefit.

Ventricular premature beats may be a manifestation of stress in a failing heart, disappearing with compensation by digitalis.

In patients undergoing mitral valve surgery, the frequent occurrence of postoperative atrial

fibrillation and subsequent congestive heart failure has led to the routine preoperative use of digitalis.⁷

The concept of digitalis contraindication in partial atrioventricular block needs modification. The danger is believed to be further impairment of atrioventricular conduction and the consequent development of complete heart block. However, in associated heart failure, therapeutically effective doses of digitalis have not increased the block and, in some cases, have relieved it when the failure was corrected.^{2,3}

If active rheumatic carditis is complicated by heart failure, digitalis is not only effective but may be lifesaving. No attempt should be made to judge the effectiveness of treatment on a basis of the change in heart rate when a regular sinus mechanism is in play. Frequently, pronounced benefit is noticed long before and independent of any slowing of the pulse.⁸

Usually, when digitalis is required, it must be given continuously and for the duration of the patient's life. There are situations in which a secondary heart failure is transient and reversible after the primary condition has been corrected. Even under such circumstances, it is possible that a structurally damaged heart may still be in failure after elimination of the other factors.⁸

LIMITATIONS

Certain types of structural damage may limit the efficiency of digitalis. Results may be disappointing in mitral stenosis with regular sinus rhythm and marked pulmonary congestion, in constrictive pericarditis or cardiac tamponade, in congenital abnormalities of the heart accompanied by cyanosis, and in the problems in which advanced inflammatory or degenerative changes have seriously compromised the myocardium.^{8,9} In chronic cor pulmonale, a trial of digitalis is needed to determine whether it is of benefit.

CONTRAINDICATIONS

Digitalis is not contraindicated when patients are receiving calcium, ephedrine, or quinidine. The possible danger of synergism has not been proved.^{2,10}

Digitalis is contraindicated in circulatory failure associated with shock, since it further reduces the low blood volume and the inefficient cardiac output.¹⁰ A differential diagnosis between shock and heart failure is not difficult if the clinical manifestations shown in table 1 are kept in mind.¹¹ If both severe shock and unequivocal congestive heart failure are present, digitalis is indicated. Electrocardiographic readings are taken before each dose.

TABLE 1

	<i>Shock</i>	<i>Heart failure</i>
Skin	Cold, clammy, pale	Cold, clammy, slightly cyanotic
Sensorium	Dull	Dull
Pulse	Rapid, feeble	Rapid, feeble
Blood pressure	Low	Low
Pulse pressure	Decreased	Decreased
Respirations	Increased	Dyspneic
Oliguria	Yes	Yes
Circulation time	Prolonged	Prolonged
Venous pressure (peripheral)	Low, normal, increased	Normal or increased
Pulmonary edema	May be present	Usually marked
Heart size	Normal or decreased	Increased
Serous effusions	No	Yes
Peripheral edema	No	Yes
Venous pressure 20+	Rare	Often
Marked liver enlargement	Unusual	Yes
Blood volume	Decreased	Increased

Digitalis is often ineffective and may even be harmful in diphtheria and myxedema and in conditions with increased cardiac output, such as anemia, arteriovenous aneurysm, thyrotoxicosis, and beriberi, until these factors are corrected.^{4,8,10}

In patients with heart disease so advanced that drug intoxication occurs before any beneficial response is obtained, the therapeutic range is actually reversed, and digitalization is not possible.⁸

The chief contraindication to digitalis is the presence of symptoms caused by its overdosage.²

Digitalis is not indicated for routine use in patients with coronary occlusion or is it necessary in the slight left heart failure frequently seen at the very onset. The drug is reserved for those cases manifesting left heart failure as a complication of this condition. Digitalis should not be administered routinely prior to surgery. It has no value preoperatively unless the patient is in heart failure, in a state of atrial fibrillation with a rapid ventricular rate,¹⁰ or is to undergo mitral valvuloplasty.⁷

In sinus tachycardia, digitalis is of no benefit unless there is concomitant heart failure.³ Digitalis does not improve the failing heart in a case of pulmonary embolism, which, for unknown

reasons, makes it impossible to slow the ventricles in the presence of atrial fibrillation.¹²

PREPARATIONS AND DOSAGES

The various digitalis preparations exhibit the same pharmacologic actions on the heart. Differences are found in percentage and rapidity of absorption from the gastrointestinal tract, in the rate of onset and cumulation of biologic effects, and in duration of activity. While any of these preparations will effect digitalization, a physician should be thoroughly familiar with at least one parenteral preparation for rapid effect and one oral preparation for slower action.^{3,4}

Dosages of several preparations for initial digitalization and maintenance are charted in table 2.

Digitoxin has a strong cumulative action. The toxicity resulting from an overdose of the drug persists for a longer period of time than does the toxicity of other digitalis preparations. Digoxin and lanatoside C act rapidly and are rapidly eliminated. Gitalin effects digitalization with about one-third the toxic dose; the other digitalis preparations require approximately two-thirds. If intoxication does appear after gitalin administration, it is not as prolonged as the toxicity produced by digitoxin or digitalis. An occasional patient, who does not respond to the other digitalis preparations because they produce evidence of toxicity before a therapeutic effect is attained, may respond to gitalin.^{8,10}

The first row in table 2 contains the customary marketed tablet strength of each preparation. One tablet is effective for about 10 lb. of body weight; for example, the average digitalizing dose for a patient weighing 150 lb. is 15 tablets.

Use of body weight in calculating dosages is only a rough guide. Each patient should be digitalized in accordance with his sensitivity to the drug. If atrial fibrillation is present, the dose may be titrated against the pulse rate in an attempt to regulate the resting pulse at a rate between 60 to 80 per minute.⁵ For an early indication of cardiac sensitivity, the apex beat may be followed. If it is slowed 40 to 50 per cent within six to eight hours after the first dose, this

TABLE 2¹⁰
ORAL DIGITALIS

	<i>Digitalis leaf</i>	<i>Digitoxin</i>	<i>Digoxin</i>	<i>Lanatoside C</i>	<i>Gitalin</i>
Tablet	0.1 gm.	0.1 mg.	0.25 mg.	0.5 mg.	0.5 mg.
Average dose for digitalization	1.5 gm.	1.5 mg.	3.75 mg.	7.5 mg.	7.5 mg.
Initial dose	ONE-HALF AVERAGE DIGITALIZING DOSE				
Dose range	1.5-3.0 gm.	1.0-3.0 mg.	1.5-5.0 mg.	5-10 mg.	5-10 mg.

suggests that the patient will be digitalized by less than the standard amount. If it is slowed 10 per cent or less, the full amount or even more may be required.¹³ The patient with a normal sinus rhythm with minimum signs of failure is the most difficult to digitalize adequately. It is frequently necessary to develop early toxic signs or symptoms in these patients and then to set the maintenance dose at a level which just avoids them.⁵

At times, it is impossible to avoid digitalis intoxication. By omitting the drug for several doses, it is possible to avoid more serious complications and, at the same time, maintain the beneficial effects.⁵ In progressive heart failure, with increasingly severe symptoms, the assurance of complete digitalization is imperative. The dose must be increased, and, as a result, mild intoxication is frequently encountered. This risk must be taken, because, at times, even slight increases in dosage will be followed by good clinical results.⁸ The desired therapeutic effect without toxicity is often difficult to achieve in elderly patients whose myocardial reserve may be greatly diminished or who may be relatively refractory to the usual doses of digitalis and in whom the therapeutic range of a digitalis preparation may, therefore, be narrowed. In these cases, gitalin is very useful because of its wide margin of safety.¹⁴

Digitalization should take place in twenty-four to forty-eight hours.³ Rapid digitalization, that is, administration of a calculated "average" digitalizing dose at once or in divided doses within twenty-four hours¹² should be avoided except in emergencies. In chronic cor pulmonale, the danger of rapid digitalization is a further increase in the pulmonary arterial pressure. Slow digitalization is also recommended when mitral stenosis is present and a high degree of mitral block is suspected. Pulmonary edema may be either precipitated or increased when the drug is speedily administered.⁸ The management of congestive heart failure rarely requires rapid digitalization. Especially in the aged, a more gradual readjustment in the dynamics of the circulation is advantageous. Overdigitalization involves a psychologic hazard, since it becomes difficult to persuade the patient to take more of a drug that has made him ill.¹³

Strophanthin is the most commonly employed emergency intravenous digitalis preparation (table 3). Administration is discontinued when the full effect of therapy appears or when the first signs of toxicity supervene. Effects are produced within five minutes after administration. The maximum response appears within one-half

TABLE 3¹⁰
INTRAVENOUS DIGITALIS

	Dosage (mg.)	
	Initial	24 hours
Strophanthin	0.25	0.5-1.0
Cedilanid	0.8	1.6
Digoxin	0.75	1.5
Digitoxin	0.6	1.2

to two hours and lasts one to three days. In order to continue digitalization, any one of the oral preparations should be administered when the first intravenous dose is given.¹⁰ Digitoxin should not be injected in emergencies, since its binding to blood proteins results in a slower digitalization than the other compounds.^{8,12}

Rapid digitalization is indicated (1) in patients in severe pulmonary edema associated with atrial fibrillation or flutter or paroxysmal atrial tachycardia, (2) when atrial fibrillation with a fast ventricular rate and low blood pressure or congestive failure is discovered in a patient requiring an emergency operation, (3) when an atrial paroxysmal tachycardia develops in a patient with coronary stenosis, (4) when atrial fibrillation exists with continuous anginal pain, and (5) when atrial tachycardia, atrial flutter or fibrillation develops in a patient with an acute myocardial infarction.^{3,12}

Weight loss, a very useful index of improvement with digitalis in adults and older children, cannot be used as an indication in infants and small children. A loss of weight amounting to 10 per cent of total body weight is easily measured in adults, while it may well fall within the margin of error of average infant scales and average weighing technic. The congestive signs of tachycardia, tachypnea, distention of the jugular vein, and hepatomegaly should be used as guides in therapy for these individuals. A satisfactory dosage schedule may be obtained if the age and weight of the patients are considered. Patients under 2 years of age need 0.02 to 0.03 mg. of digitoxin per pound of body-weight for digitalization. Children over 2 years respond favorably to dosages between 0.01 to 0.02 mg. per pound of body weight.⁹

Digitalis prophylaxis in mitral valvuloplasty is started months before surgery to afford the best protection. The maintenance dose at rest is frequently inadequate under surgery; therefore, the ventricular response to exercise is employed as an important criterion for adequate digitalization.⁷

Several weeks may be needed during mainte-

nance therapy for an error in dosage in either direction to be apparent. About 1 patient in 3 requires subsequent revision, more often downward than upward.³

TOXICOLOGY

In attaining maximum efficiency of digitalization, two-thirds of the toxic dose will have been given. In maintenance therapy, if a satisfactory given amount of the drug is doubled, signs and symptoms of overdosage appear in over one-half of these patients.⁸ Common causes of digitalis intoxication include:⁸

1. *Inaccurate history.* The most common cause of digitalis intoxication is administration of a large dose of the drug to a patient already on maintenance therapy.

2. *Inflexibility.* All patients do not require the same amounts of the drug for digitalization and maintenance, or will one person always have the same requirements under different circumstances. Advanced hepatic or renal disease may sufficiently reduce degradation and excretion to lower digitalis requirements. A euthyroid patient usually requires a reduction in digitalis dosage after I^{131} therapy.³ A false sense of security is developed by the fixed potency of digitalis preparations on the market today. The reaction is a result not of the drug's dependability but of the patient's variability.¹³

3. *Hurry.* Attempt is made to accomplish therapeutic responses too quickly. With a single digitalizing dose, 5 to 20 per cent of patients manifest toxic effects.¹³

4. *Diuresis.* In the mobilization of edema fluid, toxicity following diuresis is primarily attributable to potassium depletion. Digitalis in edema fluid is insufficient to lead to redigitalization after rapid diuresis.⁴

Occurrence of toxicity bears no relationship to the compound used but is conditioned by extent of heart failure, underlying etiology of failure, cardiac reserve, electrolyte balance, and other factors. Idiosyncrasy to digitalis is rare (thrombocytopenic purpura has been reported). Symptoms, therefore, suggest true toxicity.^{3,4}

The subjective signs of toxicity originate in the central nervous system. They most commonly result in the gastrointestinal symptoms of anorexia, nausea, vomiting, diarrhea, and copious salivation. If any of these symptoms appear within one to two hours after an oral dose, they are usually caused by local irritation and need not be confused with true toxicity. Otherwise, they are of central origin and, therefore, of greater significance. Yellow or white vision may be present, occurring most frequently with whole

leaf digitalis preparations. Retrobulbar neuritis, neuralgias of the face and upper extremities, headache, disorientation, hallucinations, delirium, and vertigo are other signs of toxicity.

Young children do not complain of anorexia or nausea. Their chief symptom in digitalis overdosage is vomiting.

In elderly patients, the chance of untoward and toxic reactions is greater than in the average younger patients. Alterations in the brain incidental to aging render the central nervous system more vulnerable. The unusual toxic effects of general malaise and depression, insomnia, irritability, mental confusion at times approaching a low grade of delirium, and visual disturbances are relatively more frequent in these patients and should be kept in mind, especially when clinical progress is not satisfactory.^{3,13}

Disturbances in cardiac rhythm are the most important effects of digitalis intoxication.⁴ Rhythm should be determined before digitalization is begun. Toxicity is considered as a possibility if (1) the heart rate increases significantly during treatment; (2) the ventricular rate does not slow down when atrial fibrillation is present; (3) the ventricular rate is markedly slow; (4) an initial regular rhythm becomes irregular in any degree; or (5) a previously irregular rhythm becomes regular with an increase in heart rate.⁸

Ventricular extrasystoles are the most common indications of overdosage. They may lead to bigeminy or trigeminy, multifocal ventricular ectopic beats, ventricular paroxysmal tachycardia, flutter, and, finally, fibrillation.^{3,4} These rhythms should be checked by listening at the apex of the heart, since premature beats may be too weak to produce a palpable pulse at the wrist.

In infants and young children, the cardiac manifestations of digitalis intoxication are quite different from the findings in adults. Ventricular ectopic beats are relatively infrequent, and atrio-ventricular conduction disturbances and atrial arrhythmias are rather common occurrences.⁹

The earliest electrocardiographic effects of digitalis are a depression of the RS-T interval followed by an inversion of the T waves. They occur before full therapeutic benefits are obtained and, therefore, are no indication for discontinuing the digitalis. Shortening of the Q-T interval and lowering of the T wave are also early effects of digitalis. Other electrocardiographic changes appear later and usually only after excessive doses.² Any bizarre arrhythmias defying interpretation should suggest digitalis intoxication.¹⁰

In patients with far advanced congestive heart failure, it is often impossible to evaluate the status of digitalization because the symptoms

and signs of digitalis intoxication can also be the expression of severe myocardial decompensation in the absence of digitalis. While the trial and error of increasing daily maintenance doses can be applied to some patients, it may be important to know the patient's condition immediately. For this purpose, use of a cardiac glycoside rapid in action and excretion would be ideal. Acetyl strophanthidin acts within one-half to five minutes after injection, full effectiveness being reached within fifteen minutes. The effects wear off in less than four hours. The drug is administered intravenously over a period of thirty seconds, 0.1 mg. every five minutes. If toxic signs develop with 0.3 mg. or less of drug, the patient is considered to be in digitalis intoxication; 0.4 and 0.5 mg. are interpreted as adequate digitalization; partial redigitalization is performed if toxicity appears after 0.6 to 1.1 mg.; and over 1.1 mg. indicates full redigitalization. Intravenous KCl is of no help in the diagnosis of digitalis intoxication because premature ventricular contractions are abolished or significantly decreased in instances where definite underdigitalization is present as well as in patients who are definitely overdigitalized.¹⁵

Manifestations of toxicity call for prompt cessation of therapy. Potassium may be beneficial, especially if there is a depletion from vomiting, diarrhea, and restricted dietary intake. In the presence of digitalis-induced arrhythmias, 5.0 gm. of KCl may be given orally in chilled fruit juice to decrease gastric irritation. If, within one hour, there is no reversion of the arrhythmias, 50 mg. of procaine amide is given intravenously every two minutes by continuous drip; blood pressure is determined every minute during this infusion. A total of 300 mg. is administered. The rate is then reduced to 50 mg. every four minutes for a total of 1,000 mg. in one hour. Initially, 1 gm. of oral procaine amide may be given, followed by 0.5 gm. every three to six hours.^{3,4}

Duration of toxicity depends upon the preparation employed, but even with severe toxicity

from the most stable preparations, pronounced improvement or complete relief is the rule within three to four days.³

SUMMARY

Digitalis exerts its major beneficial action in congestive heart failure. The strength of myocardial contraction is increased, thus disrupting a degenerating cycle of increasing venous return in the presence of decreasing cardiac efficiency. In arrhythmias uncomplicated by heart failure, digitalis acts mainly through depression of junctional conduction tissue.

Digitalis is contraindicated in shock, as it may further decrease cardiac output. It is often ineffective and may be harmful in heart failure associated with increased cardiac output until the underlying condition is corrected. Digitalis is chiefly contraindicated in therapy for symptoms due to overdosage of this drug.

Digitalis preparations are qualitatively similar in their actions on the heart. They differ quantitatively in speed of onset and duration of activity.

Each patient should be digitalized as an individual and not by a routine procedure. A rough guide in calculating dosages for digitalization and maintenance is the patient's body weight. The pulse rate can be followed in determining sensitivity to the drug in those patients with atrial fibrillation.

Rapid digitalization is an emergency procedure. Management of congestive heart failure rarely requires digitalization in less than twenty-four to forty-eight hours.

Subjective signs of toxicity become manifest most commonly in gastrointestinal disturbances. While ventricular extrasystoles are the cardiac abnormalities usually seen, any type of arrhythmia may occur. When signs of toxicity appear, therapy is discontinued. If potassium chloride is not beneficial, procaine amide may be administered. Improvement or complete relief is the rule within three to four days.

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Peptic Esophagitis

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PEPTIC ESOPHAGITIS is a clinical entity that is also known by several pseudonyms, which include reflux, regurgitant, and erosive esophagitis. These terms all refer to damage of the esophageal mucosa caused by an abnormal degree of acidity. This damage is usually due to a reflux of the acid stomach contents into the esophagus.

CLASSIFICATION

The condition is best classified as a part of a broader picture of benign esophagitis based on specific etiologic factors. In addition to peptic esophagitis, the classification of benign esophagitis includes those types due to chemicals, such as caustics and acids. There is a specific bacterial type of esophagitis due to infection. Mechanical factors, such as an indwelling Levin tube or residual foreign body can form another classification, although there is some discussion as to just how the Levin tube causes esophagitis. Many people feel that it is more likely the result of reflux caused by an incompetent sphincter due to the indwelling tube than to the actual mechanical trauma of the tube. Last, there is a congenital classification, which includes islands of ectopic gastric mucosa in the esophagus. Several of these categories overlap and will be discussed further.

ETIOLOGY

The most important etiologic factor in peptic esophagitis is that of a hiatal hernia. This condition is associated with a high percentage of the sliding type of hiatal hernias seen on roentgenograms. With the hernia, the normal anatomy and function of the distal end of the esophagus and proximal stomach are usually disturbed. It is felt that the gastroesophageal angle, the sup-

port of the right crus of the diaphragm, and the phrenoesophageal ligament are important normal anatomic findings which help prevent reflux into the esophagus. In addition to these factors, the inferior esophageal sphincter and constrictor cardia are believed to play an important part in this protective mechanism. A disturbance of these anatomic factors results in an increased reflux of the gastric contents, and esophagitis follows. A second cause of peptic esophagitis is loss of the esophagogastric junction after surgical procedures, such as esophagogastrectomy and esophagocardiomyotomy in which the mucosa is actually cut. Vomiting and regurgitation, both of systemic origin, and, due to increased weight, are important. Cardiospasm with stasis of the food causes an esophagitis not unlike peptic esophagitis and is included by some in this classification. The peptic ulcer diathesis has received considerable attention. This condition is related to the syndrome of the association of peptic esophagitis with known peptic ulcers. Approximately 40 per cent of proved cases of peptic esophagitis have an associated peptic ulcer. While ectopic gastric mucosa is considered by some to be of a congenital etiology, enough competent investigators classify it under peptic esophagitis to warrant its discussion here. Not only are isolated islands of ectopic gastric mucosa found throughout the entire esophageal lumen, but, more important, there are contiguous projections of gastric mucosa extending in an irregular fashion from the cardia of the stomach into the esophagus, which frequently cause an inflammation that is often referred to as peptic esophagitis. Additional factors which may play a part in the etiology of peptic esophagitis are advanced age, debility, and coma.

PATHOLOGY

The pathologic changes are those of a chronic inflammation which progresses to granulation tissue formation and actual ulceration. This process is superficial at first and then invades the submucosal layers. As the necrotic areas are replaced with fibrous tissue, stenosis follows. When viewed endoscopically, the picture is one

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of a diffuse inflammation. Where the epithelium is lined with squamous cells, the ulcerations are usually superficial and are covered with a plastic exudate. This can easily be removed with the tip of the scope, revealing a bleeding hemorrhagic base. In contrast to this is the condition in which ectopic gastric islands are seen. In these cases, more discrete punched out ulcers similar to those in the stomach will be noted. Of considerable importance is the factor of a secondary superimposed bacterial infection overlying the primary peptic esophagitis.

SYMPTOMATOLOGY

The complaints of the patient with peptic esophagitis are vague in the early stages. A mild substernal pain and burning are the chief complaints. Some regurgitation and heartburn develop. As the process becomes more severe, dysphagia occurs not only from the spasm present but from stricture formation. Swallowing becomes painful. With the more advanced cases, bleeding occurs with frank hematemesis and, often, tarry stools. Weight loss occurs late in the disease. Pulmonary complaints occur late and are due to retained food which spills over into the tracheobronchial tree.

DIAGNOSIS

A careful history is essential in order to elicit the complaints accurately and aid in the differential diagnosis. Physical examination is essentially negative in early cases of peptic esophagitis. Of utmost importance are careful studies of roentgenograms of the esophagus and stomach, paying particular attention to the presence of a sliding hiatal hernia. However, roentgenograms are not reliable in the early stages of esophagitis. It should be remembered that 4 per cent of the gastrointestinal examinations done in an average study show a hiatal hernia which is asymptomatic. Often the roentgenogram reveals a congenital short esophagus with hiatal hernia. This is thought to be really a shortened normal esophagus due to inflammation and fibrosis. A real congenital short esophagus is quite rare. The next most important step in diagnosis is esophagoscopy, at which time biopsy specimens can be obtained for histologic study and secretions can be collected for cytologic and bacteriologic examination.

TREATMENT

It is generally agreed that the treatment of choice for the initial stage of the disease is medical. This treatment is basically the same as that for an ulcer, consisting of a bland diet, the ad-

ministration of antacids, and liberal use of the demulcents. Antispasmodics are of value in relieving the associated esophagospasm. Systemic chemotherapy is a valuable aid in reducing the secondary infection associated with the esophagitis. The patients are greatly aided by improving their oral hygiene and by adherence to a weight reduction regime if indicated. They are more comfortable if the head of the bed is elevated on blocks so that there is a gravity drainage of the food from the esophagus and hiatal hernia to prevent stagnation. Dilation with the esophagoscope and then with Hurst mercury-filled bougies is of great importance. It is essential to start this procedure early to prevent stenosis. These dilations should be continued daily, increasing the size of the bougies as tolerated, and, as the patient becomes asymptomatic, decreasing the intervals until re-examination by esophagoscopy shows no evidence of inflammation or ulceration. For the more severe cases, filiform bougies are employed for dilation both with and through the esophagoscope. Olive-tipped dilators with string guidance are helpful. Finally, gastrostomy with a retrograde dilation may be necessary.

COMPLICATIONS

Stricture formation is the most common complication of peptic esophagitis. More serious, however, are the complications of hemorrhage, perforation, and mediastinitis. Less often considered are the complications of chronic pulmonary disease and malnutrition.

SURGICAL TREATMENT

Surgical treatment is indicated for the emergency complications previously described: hemorrhage, perforation, and mediastinitis. It is also used in cases which are considered medical failures. If, under a conservative medical regime, the patient is still not relieved of his complaints and if he is faced with a protracted period of medical treatment and dilation, surgery should be considered. The aim of the surgical procedure should be to correct the abnormal anatomy. Acid formation should be reduced by all means possible, such as partial gastric resection and vagotomy. Every attempt should be made to conserve the esophagogastric junction. Post-operatively, the medical regime should be continued, particularly the dilations with the Hurst mercury bougies.

PROGNOSIS

With an adequate medical regime as outlined, approximately 80 per cent of the patients with

diagnosed peptic esophagitis should respond to medical treatment. Surgery should be considered for refractory cases and in emergencies.

SUMMARY

1. Peptic esophagitis is a clinical entity. Its etiology and classification are still confused in the medical literature.

2. The symptoms are minimal and, early in the disease process, are vague insofar as pinpointing the diagnosis is concerned.

3. X-ray examination is important in order to establish the presence or absence of a hiatal hernia.

4. Esophagoscopy is essential if a specific diagnosis is to be made early in the disease.

5. The medical treatment of peptic esophagitis should be the first to be considered.

6. Surgery should be considered for the complications of this disease, such as perforation, mediastinitis, hemorrhage, and stenosis and in the refractory medical case.

INFLAMMATION OF THE PERITONSILLAR TISSUES is best treated by bilateral tonsillectomy during conduction anesthesia. Unilateral tonsillectomy is used only for children and elderly patients in whom peritonsillitis has not been recurrent. Repeated tonsillitis or peritonsillitis in 79 per cent of patients and occasional operative findings of unsuspected peritonsillitis on both sides are reasons for bilateral excision.

Penicillin is given just prior to surgery; other antibiotics are used for sensitive patients, and none are administered if infection is slight.

To anesthetize the upper pole of the tonsil, the palatine foramen is injected with 3 cc. of 1 per cent procaine. For the lower pole, the needle is introduced lateral to the lower insertion of the anterior faucial pillar. Continuous injection of procaine during passage of the needle through the tissues to the level of the posterior pillar provides good anesthesia without bringing the needle into contact with the abscess.

The tonsil on the healthy side is enucleated first. Pus is removed by suction. With the use of conduction anesthesia, any bleeding vessels are easily detected and immediately ligated.

Patients feel better immediately after operation, and the majority have no fever by the third day. Postoperative pain is less on the infected side because an abscess membrane covers the tonsil bed. Patients are hospitalized about four days. No significant complications appeared during or after surgery in 725 consecutive patients with peritonsillitis, 649 of whom had conduction anesthesia.

BETEL GRAHNE, M.D., University Hospital, Helsinki, Finland. Arch. Otolaryng. 68:332, 1958.

Chickenpox

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CHICKENPOX is an acute, highly communicable disease characterized by mild constitutional symptoms, a short prodromal period, and eruption of a rash which passes through the stages of macule, papule, vesicle, and crust. The lesions tend to develop in crops and dry up in a few days leaving a granular scab.

HISTORY

The disease has been recognized by physicians over a period of many centuries. Rhazes, an Arabian physician who lived in the ninth century A.D., mentioned a mild form of smallpox which did not protect against epidemic chickenpox. This disease was later described by Ingrassia in 1553, Vogel in 1765, and Heberden in 1767.

ETIOLOGY

The disease is caused by a filtrable virus, which is distinct from the virus that causes smallpox. The virus occurs in the form of elementary bodies, which are constantly found in great numbers in the vesicle fluid. When observed under the electron microscope, the elementary bodies of chickenpox appear similar to those of herpes zoster but can be differentiated from those of smallpox and of vaccinia, which, in turn, are similar to each other. For many years, the association of herpes zoster and chickenpox has been noted, both diseases often occurring simultaneously in a family group. There have been cases in which exposure to chickenpox has been followed by an attack of herpes zoster in individuals who never have had chickenpox. It may be that the two diseases are caused by different strains of the same virus.

The virus presumably enters the body through the mouth and nose and is generally considered highly contagious. The infecting virus may be air-borne for a short distance, and it definitely can be carried by infected articles to a third person. The disease is found throughout the world. It is endemic in urban areas and occurs sporadically in small communities and, more frequently, in epidemic form. Race, climate, season, and sex have no influence on the incidence of chickenpox. Because of its great infectivity, the disease is usually contracted on the first exposure. Hence, the majority of cases occur in young children. However, the disease has been reported present at birth and in the first few days of life and also in very aged persons. It appears to occur most commonly during the fall, winter, and spring months and is seen relatively infrequently during the summer months. As mentioned previously, all persons are susceptible, but infants may be immune for the first 6 months of life if the mother has had chickenpox. One attack of the disease confers lasting immunity with few exceptions.

EXANTHEM

The lesions characteristically consist of macules and papules, many of which develop into vesicles and occupy only the outer layer of the skin. Microscopic examination of the pox shows first a swelling of the cytoplasm of the nuclei of the epithelial cells. Balloon cells develop, some of which are multinucleated. Liquefaction of the swollen cells follows with formation of vesicles. Intranuclear inclusion bodies have been observed in a number of cells within the vesicles. The pox of chickenpox may develop from several centers, so that the fluid may be confined in several compartments or in only one. The red areola which often surrounds the pock for an

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area as large as 1 cm. in diameter is formed by distended capillaries. The fluid contained in the pock is at first a clear serous fluid which later becomes cloudy and thicker as loose epithelial cells and some leukocytes accumulate in it. When secondarily infected, the fluid becomes purulent. While there is still fluid in the pock, the thin pellicle over it is easily scratched off. As the fluid in the pock is absorbed, a scab somewhat granular in character and irregular in outline forms and adheres rather tightly. Later, it becomes loose and quite easily detached. In most cases, the skin returns rapidly to normal after the pox disappears. If, however, the scabs are scratched off too soon or if secondary infection has taken place, the process extends deeper into the layers of the skin and involves the corium. As a result, a shallow depressed scar is formed which is at first reddish in color and remains somewhat pigmented for many years. Pox may also occur on the mucous membranes, causing lesions similar to those in the skin but slightly deeper. They may be seen in the buccal mucosa, the conjunctiva, and the vagina.

CLINICAL COURSE

The incubation period is fourteen to twenty-one days. More recently, the shorter incubation period appears most common. The disease is mild in character, and the prodromal period is of short duration, particularly in children. Prodromal rashes resembling the eruptions of scarlet fever or measles are occasionally seen. Often, however, the rash of chickenpox appears on the day the patient first becomes ill. When there is a prodromal period, it is characterized by a moderate elevation of the temperature, headache, and malaise. Without much change in temperature, the rash appears on the body and, later, on the face, neck, and extremities. In general, the lesions are most numerous on the trunk, and distribution of the rash is somewhat centripetal. The period of exanthem is usually quite rapid. A child's skin may be clear on one examination and show several macules two to four hours later. The lesions progress rapidly, and, a few hours after the macules appear, they have evolved into a papular stage and almost as quickly changed to the vesicular stage characterized by small blisters on a red base. Many macules and papules remain small and do not become vesicles. A few pox may appear as single vesicles on the skin because the area of redness is missing. The vesicle has a thin covering and readily breaks with pressure. Usually, within a period of two to four days, the pox have gone through the various stages of macule, papule,

vesicle, and crust. Additional crops appear from time to time and have been noted as late as a week to ten days after onset of the disease. All stages of the rash are present after the second day. The lesions of chickenpox are usually discrete, but they may be so numerous in some areas that the skin may appear to be solidly covered. When secondary infection occurs, the fluid in some of the vesicles becomes turbid. There may be no fever at any time during the course of the disease, but the temperature usually rises the day of the onset of the eruption to about 101° F., returning to normal in twenty-four to forty-eight hours. In more severe cases, however, the temperature may rise to as high as 104° and may persist for several days. Occasionally, secondary infection of the skin may be encountered, with the invasion usually due to hemolytic streptococci, or superficial staphylococcus infection may develop in the form of impetigo. Encephalitis has been observed in rare instances.

DIFFERENTIAL DIAGNOSIS

Chickenpox is to be differentiated from smallpox, herpes zoster, rickettsial pox, impetigo, pemphigus, insect bites, and syphilis. The chief difficulty in diagnosing chickenpox has been to differentiate it from smallpox, particularly the milder type. It should be noted that in smallpox, the incubation period is shorter, the prodromal stage more severe and of longer duration, and temperature is usually higher during the prodromal period and approximates normal with the appearance of the rash. The distribution of the lesions is centrifugal, involving the exposed surfaces more frequently. All of the lesions are identical during any one time of the disease, and they are in the same stage of change. Chickenpox has a longer incubation period, the prodromal symptoms are mild, and the prodromal period rarely exceeds two days. Temperature is lower, but fever continues throughout the time the new lesions appear. The distribution of the rash is centripetal. The lesions are always seen in various stages of change and appear in crops.

PREVENTION AND CONTROL

In most communities, chickenpox patients are neither isolated nor quarantined but are excluded from school until most of the primary scabs have disappeared. The period of communicability probably is not more than one day before or more than six days after the appearance of the vesicles. Because of its very contagious nature, chickenpox is difficult to control in hospitals, schools, and boarding homes. A child is

considered exposed if he has been in contact with the patient during the twenty-four hours preceding the rash or during the disease for a total of about a week. Children exposed at school or at home who have not had the disease are usually allowed to continue at school provided they are carefully observed during the period of about eleven to seventeen days following exposure. Under ordinary circumstances, by the time the first case has been diagnosed in a family, the rest of the children have been thoroughly exposed, and it is hardly worthwhile to separate them rigidly from the patient. Gamma globulin has no remarkable prophylactic effect in chickenpox.

TREATMENT

There is no specific remedy for the disease. The patient should be kept in bed while the temperature is elevated, and attempts should be made to prevent secondary infection of the pox

by trying to keep the patient from scratching the lesions. The fingernails should be kept clean and trimmed. When itching is pronounced and scratching difficult to control, gloves may be kept on the patient's hands, or it may be necessary to splint the arms at the elbows. The itching usually may be relieved by the use of calamine lotion or other similar anesthetic ointments, such as the antihistamine lotions. Daily sponging is generally permitted. However, caution should be taken not to rub the scabs off the pox. Treatment otherwise is symptomatic. Severe complicating infections usually respond to antibiotic therapy.

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THE BELIEF THAT, due to edematous tissues, the weight loss of infants born to diabetic mothers is greater than that of babies of nondiabetic mothers is apparently erroneous. When fed alike, infants of diabetic and nondiabetic mothers delivered by cesarean section lose similar amounts of weight.

Pitting edema in newborn infants of diabetic mothers has been noted by some and denied by others. A puffy, even bloated, appearance is lost during the first week of life. During the first two days of life, these babies pass 3 times as much urine as do those of nondiabetic mothers, but the urine volumes do not account for much difference in weight.

To test the influence of other factors besides maternal diabetes, weight loss was compared among (1) 31 infants of diabetic mothers delivered by cesarean section and fed within the first twenty-four hours; (2) 29 infants of diabetic mothers delivered by cesarean section and not fed for seventy-two hours; (3) 60 babies born by cesarean section to nondiabetic women who were not in labor before operation; and (4) 60 babies born spontaneously by vertex to nondiabetic mothers.

No significant differences in mean percentage weight changes were evident during the first day, whether or not the mothers were diabetic. Deferred feeding caused greater initial weight loss, with a slightly more rapid regain up to fourteen days.

Further investigation is needed in order to establish the influence upon postnatal weight loss of such factors as the reason for cesarean section, nature of labor, time lapse before clamping the cord, maturity, and feeding details.

JAMES W. FARQUHAR, M.D., and STANLEY A. SKLAROFF, M.D., University of Edinburgh and Royal Infirmary, Edinburgh. Arch. Dis. Childhood 33:323, 1958.

Therapy of Allergic and Nonallergic Asthma

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THE SYMPTOM COMPLEX of bronchial asthma, which consists of cough, wheezing, and dyspnea, is divisible into two forms: allergic and nonallergic.

ALLERGIC BRONCHIAL ASTHMA

Allergic bronchial asthma is a disease of childhood and young adults. The average age of onset in my series was just under 5 years in 450 cases classified as allergic. The majority of these patients were under 15 years of age when treated, but even those adults under 40 who presented themselves for therapy dated their symptoms from childhood in over 50 per cent of the cases (tables 1 and 2).

Diagnosis. In true allergic asthma, the bronchial tissues are rarely the sole target organ, and 25 per cent of the patients revealed a history of infantile or juvenile eczema, and 98 per cent had, at the time of examination, either seasonal or chronic allergic rhinitis. Additional aids to diagnosis are a family history of allergies—present in over 80 per cent of the cases, either in the parents, siblings, or other relatives—and the precipitation of attacks by seasonal pollens, foods, dusts, or dander. A beefy, polypoid swelling of the nasal mucosa or a pale, wet nasal lining are uniformly present in my experience, although, in warmer climates, I am told that this is frequently not the case. Exercise, particularly in cold weather, often precipitates attacks, and recurrent common colds are also frequently responsible. While psychosomatic factors, which can be relieved by “parentectomy,” often complicate the condition in children, specific psychotherapy proved effective in less than 1 per cent of my cases. Many children, although not having attacks of wheezing with dyspnea, have a chronic cough, which is worse after exercise or at night, a condition which I have termed *subclinical asthma*. Emphysema developed prior to the age of 15 in 5 per cent of my patients, all of whom improved on cardiac therapy. This relationship between emphysema, right heart strain, and asthmatic symptoms will be discussed more fully under nonallergic asthma.

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One-third of the children in this series with asthma had hypertrophied tonsils and adenoids, which regressed under proper medication, but, in approximately 1 per cent of the cases, surgery was required and resulted in improvement.

It is my policy to avoid skin testing for specific allergies, since precipitating factors can usually be determined by a careful history, and multiple sensitivities are the rule rather than the exception. When exposure to animal danders and certain foods are known to precipitate attacks, avoidance is recommended during the early stages of treatment. The differential white cell count is often helpful in establishing diagnosis. It is usually elevated during attacks, with a relative lymphocytotic and an eosinophilic count ranging from 5 to 10 per cent. Eosinophils also predominate in the nasal smear and sputum. A swab of nasal secretion diluted with normal saline often gives a positive intradermal test. I have termed this the “nose to arm test.” A roentgenogram of the chest is usually negative, although it may show emphysema or areas of atelectasis, but the latter usually disappear with treatment.

In young adults, allergic asthma is often seasonal or occupational. The asthmatic child often breathes through his mouth, and teen-agers as well as adults are usually spray addicts or wedded to a nebulizer, which, in itself, is a psychosomatic complication of the disease. The overuse of this method of administering sympathomimetic drugs tends to provoke chronic cough and asthmatic attacks, and every attempt is made to break the habit of their use.

I have used quinoline therapy for the control of bronchial asthma since 1948, because it can be demonstrated experimentally that certain forms of quinoline are both antihistaminic and anticholinergic and that they are definitely bronchial dilators and are concentrated in respiratory tissue. The amount concentrated in the lungs is approximately 80 times that in the plasma; only in the liver is concentration higher. I have seen toxic effects on the liver in less than 1 per cent of the cases, and these untoward symptoms disappeared within three to six days after quinoline therapy was discontinued. These side effects are

TABLE 1
JUVENILE ASTHMA (ALLERGIC BRONCHITIS)

Differential diagnosis: rule out pulmonary tuberculosis, histoplasmosis and other granulomatous infections, bronchiectasis, fibrosing pneumonitis, bronchial adenoma, and foreign bodies.

Clinical history

Ages—to 20 years; onset—usually under 13 years. History of infantile eczema and familial allergies. Frequent recurrent attacks with "colds." Attacks also precipitated by foods, pollens, dusts, danders, or exercise, particularly in cold weather. May be preceded for months or years by chronic cough. Asthma may occur with tantrums or in teen-agers from addiction to sympathomimetic sprays.

Characteristic physical findings

Congested or pale, boggy nasal mucous membranes and choanal polyps. Adenoid facies with mouth breathing. Wheezing only with attacks. Emphysema rare; occurs in only 5 per cent of cases.

Laboratory findings

Elevated white blood count, often with relative lymphocytosis and eosinophilia, eosinophils in nasal discharge. Swab of nasal secretions diluted with saline often gives positive intradermal test (author's nose to arm test). X-ray of chest usually negative but may show areas of atelectasis, which disappear with treatment.

TABLE 2
ADULT BRONCHIAL ASTHMA (ALLERGIC BRONCHITIS)

Differential diagnosis: rule out pulmonary tuberculosis, histoplasmosis and other granulomatous infections, bronchiectasis, fibrosing pneumonitis, bronchial adenoma, and other intrathoracic tumors.

Clinical History

Ages—20 to 40 (onset may date from childhood). Familial history of allergy. Attacks often occupational or seasonal or preceded at times by several years of hay fever. Psychosomatic factors or foods may precipitate attacks. Attacks may occur with new household furniture or after moving to a new home. Patients often addicted to adrenalin and ephedrine sprays.

Characteristic physical findings

Congested nasal mucous membrane or polypoid rhinitis usually present. Typical musical chest with inspiratory and expiratory rales during attack. Eczema and other skin rashes may be present. Status asthmaticus usually in those addicted to adrenalin or ephedrine sprays.

Laboratory findings

Eosinophils 4 to 15%. White blood cell count elevated at times. Elevated blood pressure only with previous epinephrine therapy. X-ray of chest normal (emphysema 10% of cases). Normal EKG and circulation time.

TABLE 3
PHARMACOLOGY OF PHTHALAMAQUIN

Acute toxicity (rats)	150 mg./kg. L.D. 50
Chronic toxicity (rats)	50 mg./kg. I.M. daily; well tolerated for 6 months 100 mg./kg. I.M. daily; 50% died within 2 weeks
Chronic toxicity (rabbits)	17 mg./kg. I.M. daily; well tolerated for 4 months* 25 mg./kg. I.M. daily; well tolerated for 4 months*
Chronic toxicity (dogs)	25 mg./kg. administered orally by stomach tube well tolerated for 6 months†
Adult initial dose for 10 days	Total 200 mg. daily for 10 days orally
Adult maintenance dose (3 to 6 months)	Total 150 mg. daily orally (50 mg. t.i.d. after meals)
Early toxic side effects	Tremor, nervousness—5% Nausea, diarrhea—1%
Late toxic side effects	Severe anorexia—3% Cholangitis (recovery in 5 to 10 days after withdrawal of drug)—0.7% Transient blurring of vision or tinnitus—1%
Late toxic effects on hemogram	None observed to date

*Rabbits on 17 and 25 mg./kg. intramuscularly daily develop increasing signs of toxicity in the fifth and sixth months, indicating that high doses of Phthalamaquin are accumulative.

†One dog died of pneumonitis on the fourteenth day as result of aspiration of drug.

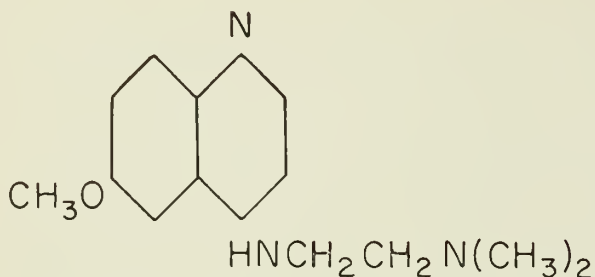


Fig. 1. Formula for Phthalamaquin: 4-(4-dimethylamino ethylamino)-6 methoxy quinoline.

never severe if anorexia is used as an indication to discontinue the therapy. Transient blurring of the vision, tremor, and nervousness are other indications to discontinue this mode of treatment, but these symptoms occurred in less than 5 per cent of the cases. Over 80 per cent of patients in my series responded satisfactorily to treatment, and others who have treated 20 or more cases have each reported favorable results in 65 to 75 per cent. Quinoline therapy is a basic method of controlling the allergic response, and no attempt is made to increase the dosage for peak exposure during acute attacks. With such peak exposure, which causes a breakthrough, aminophylline is added to control symptoms. Oral cortisone may be added for three to four days, using 25 mg. twice daily or 5 mg. of Meti-corten. The quinoline preparation used is Phthal-amaquin. Its formula is shown in figure 1 and its pharmacology in table 3.

All medication is oral. Since Phthalamaquin is cumulative, the initial treatment or loading dose is higher than the maintenance dose. In children 5 to 12 years of age, the initial dose

is 3 capsules daily for a period of a week. For adults, the dose is 4 capsules daily for ten days. Each capsule contains 50 mg. The maintenance dose is 2 capsules a day for children and 3 daily for adults.

NONALLERGIC BRONCHIAL ASTHMA

Nonallergic bronchial asthma is nearly always a complication of chronic pulmonary emphysema or filariasis if roentgenograms of the chest are negative for masses or unusual infiltrations. Increased lung volume and increased radiolucency in the films confirm emphysema and rule out infarct, neoplasm, vascular sclerosis, and pulmonary infiltration secondary to infection and pneumoconiosis. Absence of pulmonary edema rules out acute ventricular failure (table 4). Diminished diaphragmatic excursion is readily demonstrated in nonallergic asthmatic patients.

Chronic cor pulmonale is seen at times in children or young adults but occurs usually in patients over 50 years of age whose emphysema may be due to allergic asthma in early life, in which emphysema is a residual complication, or develops de novo in patients with broad deep chests or kyphosis.

My observations indicate that if asthma develops in an adult after 50 years of age in the presence of a negative family or personal history for allergies and if polypoid rhinitis is not present on inspection, he does not have allergic bronchial asthma and should be treated for emphysema and right heart strain unless the chest film discloses a definite lesion. Elderly asthmatic patients do not have "intrinsic asthma" but are emphysematous cardinals. If the diagnosis of emphysema is confirmed in the presence of asth-

TABLE 4
NONALLERGIC OR POSTEMPHYSEMATOUS ASTHMA (CHRONIC COR PULMONALE)

Differential diagnosis: rule out bronchiectasis, pulmonary tuberculosis, pneumoconiosis, beryllium poisoning, carcinoma of the lung, and true cardiac asthma.

<i>Clinical history</i>	<i>Characteristic physical findings</i>	<i>Laboratory findings</i>
Age over 45. History of allergic asthma in childhood with many years remission or no previous allergy in patient or family. Recurrent asthma or first asthmatic attack within past year or two. Present asthmatic state precipitated by respiratory infection with residual fibrosis or present asthmatic state precipitated by arteriosclerotic heart disease, often associated with hypertension.	Rigid emphysematous chest which is bell, barrel, elongated, or round in shape; at times, pigeon-breasted since childhood. Limited respiratory excursions under fluoroscope or on percussion of lung borders. Decreased vital capacity, low residual air (maximum expiration decreased). Dyspnea and cough persisting in absence of wheezes. Wheezing usually on expiration only. Between attacks, rales may persist at base. May have status asthmaticus. Nasal mucous membranes free of polypoid rhinitis. Attacks often nocturnal.	Red cell count often 5+ million. Eosinophils normal. Blood pressure 180-190/100-110 in absence of myocardial damage. Circulation time slightly or definitely prolonged. Albuminuria with normal specific gravity. EKG shows left myocardial damage or right ventricular strain. X-ray of chest reveals emphysema or pulmonary congestion. Diastolic pressure rises when liver is rotated against spine, compressing vena cava in acute lumbar lordosis or with Valsalva maneuver.

matic symptoms, they should be treated not primarily for infectious bronchitis but for chronic cor pulmonale. Therapy toward the lung is secondary. In such patients, sympathomimetic drugs are contraindicated. They increase cardiac output and add to the strain. I have presented the evidence elsewhere,¹ which indicates that emphysema imposes a handicap on the coronary circulation, since it empties into the right auricle which is at intrathoracic pressure. Positive intrathoracic pressure is prolonged in emphysema because of prolonged expiration. The major cause of chronic nonallergic asthma, however, is right ventricular strain secondary to pulmonary disease, usually emphysema. Borden and

associates² have demonstrated by intracardiac catheterization that the cause of the heart strain is hypertension in the pulmonic circuit. Their mean values in emphysema were 37/22 mm. Hg, which corresponds to a systemic blood pressure of approximately 210/140, compared to the normal of 22/8 mm. Hg.

It is surprising that the textbooks still list these patients as cases of intrinsic forms of asthma secondary to bronchial infection without reference to cardiac strain. In my series of over 200 cases, as far as I could determine, adequate cardiac studies had not been made prior to my examination, although about 30 per cent of these patients had positive electrocardiograms, some with

TABLE 5
PATHOLOGIC PHYSIOLOGY OF PULMONARY EMPHYSEMA

- | | |
|-----------------------|--|
| A. Pulmonary changes: | |
| 1. | Increased pulmonary rigidity |
| 2. | Prolonged respiration, with increased duration of positive intrathoracic pressure and increased residual air |
| 3. | Poor gaseous mixing |
| 4. | Increased bronchial secretions due to wetness or infection |
| 5. | Bronchial constriction due to anoxia |
| B. Vascular changes: | |
| 1. | Reduced vascular bed |
| 2. | Pulmonary hypertension |
| 3. | Diminished O ₂ saturation and increased CO ₂ content |
| 4. | Polycythemia and hypervolemia with increased blood viscosity |
| 5. | Respiratory center controlled by O ₂ and not CO ₂ (respiratory acidosis) |

Clinical signs: Cyanosis, venous engorgement, hepatomegaly, and dependent edema are late signs of severe cor pulmonale. Early signs are entirely respiratory and include dyspnea, wheezing, and cough, which are usually worse at night. There may be cyanosis of the fingertips when the hands are held in a dependent position. Pulse pressure declines toward zero on Valsalva maneuver.

TABLE 6
CONTRASTING FEATURES OF RIGHT- AND LEFT-SIDED HEART FAILURE

Features	Right	Left
A. Fails forward: Causes:	<i>Pulmonary function impaired:</i> Chronic impairment of the pulmonary vascular bed by emphysema, infiltration, or fibrosis of lungs; acute obstruction of pulmonary artery or its major branches; acute myocardial dilation. Direct injury to myocardium or valves is rare.	<i>Renal function impaired:</i> Chronically increased peripheral resistance in the systemic circulation or persistent direct impairment of myocardium or valves or acute myocardial damage. Right-sided failure impedes coronary outflow and may result in myocardial infarction.
Symptoms:	Productive cough, dyspnea, wheezing, early orthopnea, polycythemia, CO ₂ retention, and reduced O ₂ in blood leads to left heart strain.	Oliguria; albuminuria; salt retention; dyspnea, on exertion only; and late orthopnea.
B. Fails backward: Causes:	<i>Liver and large veins engorged:</i> Follows longstanding forward failure or secondary to left ventricular failure.	<i>Lungs engorged:</i> Follows forward failure.
Symptoms:	Cyanosis; distended neck veins; enlarged, tender liver; dependent edema; ascites; renal congestion; and albuminuria.	Pulmonary congestion and edema with cough and rusty sputum, signs of right ventricular failure in advanced cases, mild polycythemia, CO ₂ retention, and reduced O ₂ in blood.

bundle-branch block. About 20 per cent of patients with emphysema and right ventricular strain have a previous history of allergic asthma and may have residual symptoms, so that both emphysema and asthma are present.

Altshule³ has emphasized the importance of compensatory polycythemia in patients with both pulmonary and cardiac disease. The red cell count and hematoerit, therefore, provide confirmatory diagnostic evidence. Unfortunately, the degree of right heart strain in emphysema is not correlated with pulmonary ventilation studies but with the degree of oxygen saturation in the blood — the lower the oxygen saturation, the higher the pulmonary hypertension, as shown by the direct catheterization studies of Borden and associates.² Therefore, in the last analysis, the diagnosis rests upon the nonallergic nature of the respiratory symptoms and the degree to which they can be benefited by cardiac therapy (table 5).

I have developed a simple test for demonstrating intrapulmonic hypertension resulting from increased resistance in the pulmonary vascular bed, which results from longstanding emphysema or pulmonary fibrosis. The blood pressure is first recorded and the cuff left on the arm. The patient is then asked to perform the Valsalva maneuver. In other words, he is asked to take a deep breath and then strain by exhaling against his closed lips as if he were blowing up a toy balloon. He thus holds his breath and strains from thirty to forty seconds. In the normal patient, the increased intrathoracic pressure exerted against the large veins causes a mild drop of systolic pressure by preventing adequate venous return to the heart. At the same time, the diastolic pressure rises about 10 mm. in order to compensate for this difficulty in venous return. The reflex occurs in several seconds. If the patient has increased resistance in the pulmonary vascular bed, this further diminishes the ability of the right side of the heart to deliver blood across the pulmonary circuit to the left side, so that the systolic blood pressure falls abnormally to a point where it is only 5 to 10 mm. above the diastolic. If the pulse is palpated at the wrist during the maneuver in such a patient, it practically disappears or is

almost imperceptible. The decline in pulse pressure during the Valsalva maneuver to half or less than its previous volume indicates increased intrapulmonic vascular resistance or hypertension.

The usual signs and symptoms described in textbooks, such as cyanosis; distended neck veins; enlarged, tender liver; dependent edema; and ascites, which are associated with right-sided heart failure, are late signs of backward failure and are of no help in early diagnosis when the right ventricle is suffering from forward failure and when the predominant signs and symptoms are related to the pulmonary changes. As in left-sided failure, the first signs are forward and are produced by the major organs supplied on the arterial side. The kidney suffers first in left-sided strain; the lungs in right-sided strain. Later, with backward failure, the lungs suffer in left-sided failure and the liver in right-sided failure (table 6).

Therapy. In nonallergic asthma in elderly patients, a maintenance dose of digitalis or squill therapy should be used. Many of these patients do better on the latter. I use 0.8 mg. of Scilaren twice daily, since it is usually better tolerated in right ventricular strain, and there is less danger of overdosage. Mercurial diuretics may be used in the early stages of treatment. Salt restriction is not indicated unless there is dependent edema. The patients have less night asthma if the head of the bed is elevated. For bronchial dilation, I use Phthalamquin therapy as in adults with allergic asthma. Aminophylline can be added for early morning use once daily. The treatment is highly satisfactory in over 90 per cent of these cases, but cardiac coronary complications in the form of coronary occlusion may occur in approximately 3 per cent of the patients followed for five years.

Phthalamquin was supplied for this study by S. B. Penick & Co., New York City.

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Treatment of Mild Depression with Deanol Para-Acetamidobenzoate

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ACCORDING TO MANY OBSERVERS, 85 per cent of patients who are seen in private practice complain of chronic mild depression, easy fatigue, frequent headaches, and other related complaints. Although they have no demonstrable organic disease, these individuals are unable to perform their daily tasks adequately. There are, moreover, a large number of patients who, although relieved of severe depression by electroshock therapy, are still in need of an agent which will produce a complete return to a state of normal well-being. The classical stimulant, amphetamine, and related drugs may produce temporary exhilaration but also nervousness, jitteriness, excessive motor activity, and insomnia. Emotional and physical "letdowns" are frequent after effects. Thus, we were particularly interested in trying a new chemical stimulant, deanol (Deaner). Deaner has been reported to relieve mental depression and fatigue and to stimulate learning.¹⁻³ It is postulated to be a naturally occurring constituent of the body, and its stimulating effect on the central nervous system is said to result from its conversion in the brain to acetylcholine or some similar substance.¹⁻⁴ This stimulation differs from that produced by the amphetamines in that it develops slowly over a period of two weeks. A drug-like letdown or after-depression does not occur, and the stimulant action, when fully developed, lasts at least twenty-four hours.⁴ Because its toxicity in laboratory animals and in human beings is very low, and the drug had been reported to be clinically safe without the disadvantages of amphetamine therapy, we undertook to investigate Deaner therapy in a small group of chronically depressed patients.

The series was comprised of 17 individuals, of whom 16 were women. Ages ranged from 27 to 64 years. Moderate to pronounced improvement was observed in 13. In those who benefited, the daily dose of Deaner varied from 12.5 to 225 mg. In most patients, the dose was 50

mg. Improvement began three days to two weeks following onset of therapy and consisted of decrease or disappearance of headaches, fatigue, and depression. In general, the patients' ability to carry out daily tasks returned. Seven of the 13 patients who benefited had had severe depressions which were converted into mild depression by electroshock therapy. They required the addition of Deaner to bring about an apparently complete recovery. Two others failed to respond to electroshock therapy but responded well to Deaner. Three of the patients who improved on Deaner had previously taken other medications, including amphetamine, Ritalin, and Meratran, without benefit. Most of those who benefited from Deaner have continued the therapy for as long as eight months, and no undesirable effects have been noted. The 4 patients who did not improve on Deaner therapy appeared to be the more severely depressed of the group. Of these, 2 subsequently were relieved by electroshock therapy.

Of the 17 cases, the following are reported in detail as representative of the series.

CASE REPORTS

Case 1. S.P., a 55-year-old housewife, had been ill for about ten years. Initially, she had presented symptoms typical of a severe depression which responded to a course of electroshock therapy. About six years ago, she relapsed and again responded to shock treatment but never became completely well. She was chronically mildly depressed, easily fatigued, and had difficulty leading an active life. This state persisted for six years.

Deaner therapy, 25 mg. daily, was instituted, and, after three days, the patient reported improvement in energy and a sense of well-being. This feeling persisted for about four days and then disappeared. Deaner was increased to 25 mg. twice daily, and the patient's feeling of general well-being returned and has continued for the past three months on this therapy.

Case 2. H.P., a 30-year-old single woman, a librarian, developed an acute depression which necessitated electroshock therapy. She responded well but did not return to her previous state of well-being. She continued to complain of mild depression, headaches, and easy fatigability. After two months in this condition, she was placed on 25 mg. of Deaner twice daily. Over a three weeks' period, she gradually improved so that at the end

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of this time she felt that she was "her old self again." After a month, the medication was discontinued, and her symptoms returned. Deaner therapy was started again, and her symptoms cleared.

Case 3. F.W., a 38-year-old housewife, had been ill for about eight years. Symptoms consisted of frequent headaches, feelings of weakness, fear of leaving home, and fear of entertaining people in her home. She was mildly depressed. Sedatives, tranquilizers, mood-elevating drugs (amphetamine, Ritalin, and Meratran), and medication usually given for headaches were administered without benefit. In addition, the patient had received a course of intensive psychotherapy from another psychiatrist and a course of electroshock therapy without benefit.

She was placed on 10 mg. of Deaner daily for three weeks without apparent improvement. The medication was then increased to 25 mg. daily, and, after three weeks, the patient reported a decrease in headaches, increased energy, and less depression. With an increase in Deaner to 25 mg. twice daily, her symptoms completely disappeared. She is now able to entertain and to go about freely. Her husband reports that she is as well as she was ten years ago.

SUMMARY

In summary, 17 individuals with mild to moderate emotional depression and somatic complaints, such as headache and chronic fatigue, were treated with Deaner. In none of the patients could an organic illness be diagnosed. Of the group, 13 obtained moderate to pronounced relief of their symptoms. Of these, 9 had been given electroshock therapy prior to Deaner, 2 without effect and 7 with only partial benefit.

On Deaner therapy, a normal state of well-being completely returned.

A consideration of these 17 cases suggests that possibly there are at least two neurophysiologic mechanisms involved in the production of depressions—one can produce very severe depressions and responds to electroshock therapy; the other produces only a mild depression and is associated with fatigue and frequent headaches and responds to Deaner. If these two mechanisms are present, a combination of electroshock therapy and Deaner will be required to effect an apparent recovery. If only one mechanism is operating, only one therapeutic agent will be necessary. From this experience, it is concluded that Deaner therapy warrants further investigation along these lines.

Deaner, the para-acetamidobenzoic acid salt of deanol (2-dimethylaminoethanol), was supplied for this study by Riker Laboratories, Inc., Northridge, California.

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SEVERAL CASES OF HEMOPHILIA in women have been reported since 1951. The condition was diagnosed by history, laboratory findings, and the hereditary pattern. The clotting time is increased, and the prothrombin consumption test shows no consumption of prothrombin in the true hemophilic patient. Nearly all women with hemophilia-like conditions were over 20 years of age when first studied, which suggests that bleeding was not severe.

Congenital bleeding conditions characterized by defective thromboplastin production have now been found in 4 additional girls. In 1, the disease is indistinguishable from classic hemophilia except that no cases have occurred in the family. Mutation is probably responsible.

The second patient has not only defective thromboplastin generation and prothrombin consumption but a prolonged prothrombin time—a condition similar to or identical with the recently named Stuart clotting defect.

In the other 2 patients, thromboplastin generation and prothrombin consumption are faulty, prothrombin time is normal, and bleeding time is greatly prolonged. This defect may be termed pseudohemophilia B, since it resembles Willebrand's disease or pseudohemophilia A, except that it is apparently inherited as a recessive trait, only the homozygote being a bleeder.

ARMAND J. QUICK, M.D., and CLARA V. HUSSEY, M.S., Marquette University, Milwaukee. *Lancet* 1:1294, 1958.



Notes from a Medical Journey

September 21, 1958
Bruges, Belgium

Dear Jay:

Since parting at Wold-Chamberlain Field five weeks ago, you on your way to Japan and I off to Finland, the world prestige of the University of Minnesota has not diminished. Dr. Noboru Kimura, who awaited me on arrival at Brussels a week ago, had just flown over the Pole from Tokyo so he was able to tell me that you led the cheers for Minnesota at the Tuberculosis Congress in Japan.

For the first time in many weeks, Copenhagen enjoyed fine, sunny weather on the day of my arrival and, until yesterday, all this part of the world has basked in warm sunshine ever since. Even Helsinki, at 61° north latitude, was minus topcoats, and I did not die from the shock when I plunged into the Gulf of Finland on the sixth of September. Of course, that was after half an hour in the sauna at 205° F., which helped. All northern Europe had a miserable cold and rainy summer so the change of weather put everyone in good humor. Anyway, my lectures were well received, and the conferences about future heart research in all of these countries wound up with full accord and some definite plans.

Next year will see the initiation of epidemiologic research on heart disease, blood lipids, and the diet in Norway and the Netherlands, with Sweden and Denmark, in all likelihood, refusing to be left behind. As for Finland, the success of the work we began there in 1956 has impressed everyone, and a larger scale, long-time program will start there at the end of next summer under the sponsorship of Drs. Martti Karvonen, Paul Soisalo, Pentti Halonen, Niilo Pesonen, Paavo Roine, and Lauri Kalaja, plus the Finnish Heart Association. And, there will be plenty of younger assistants and collaborators trained for the job -- Drs. Esko Orma and Sven Punsar, who have just finished a year with me at Minneapolis; Drs. Rautaharju and Härtl, who will arrive in Minnesota around Christmas-time; and Miss Maija Pekkarinen, a top-flight dietitian.

So far our work in Finland has shown that (1) myocardial infarction is excessively common among the hard-working farmers and loggers (and also

among city folk in Helsinki); (2) serum cholesterol values are higher in Finland than we have found anywhere else in the world; (3) the diet in Finland averages a little lower in total fats than the Minnesota diet but is the highest in saturated fats that we have recorded -- butterfat accounts for the latter; (4) in all groups in Finland, the cigarette smokers have higher serum cholesterol concentrations and slightly lower blood pressures than do the nonsmokers; (5) serum cholesterol is higher in East than in West Finland, and this corresponds to reported but not clearly proved difference in the frequency of coronary heart disease between the two regions; (6) the diet in East Finland seems to be considerably lower in iodine and somewhat higher in saturated fatty acids than that in the West, but surveys in all seasons of the year are needed; and (7) bigger thyroid glands and a higher frequency of thyroid deficiency in East than in West Finland has been reported many times; now it appears that, among people dying in Finland, the thyroid glands of the coronary patients are considerably bigger, on the average, than in those dying from other causes.

You will understand why it is important to do a lot more research in Finland, especially follow-up studies. They have a good medical organization, a high percentage of autopsies, and a very stable and cooperative population. The only difficulties are the language and the location, distant from most of Europe and a long way from the Twin Cities. To the handicaps we might add the climate (mostly bad) and the roads ("paved" with clay that turns to dangerous, slick goo in wet weather, which is most of the time). Anyway, as I have said, we hope to start the big long-time push in Finland in September next year. Just preceding this, I shall try to arrange a meeting in Helsinki of the Research Committee of the International Cardiology Society. Dr. Michael Oliver of Edinburgh and Professor John Brock of Cape Town hope to participate in the start of the new research program in Finland, and other members of the Research Committee -- Malmros of Sweden, Puddu of Italy, and our own Paul White -- think they could make it also, and Kimura would attend the meeting and help in the subsequent research in Finland if we can find the money for the trip from Japan.

Things are looking up in Sweden. Dr. Arthur Engel, director general of Swedish Medical Services, is much interested in promoting our type of heart research. Professor Harald Cramer, chancellor of the Swedish universities, gives it his blessing, and our collaborator, Gunnar Biorck, has just succeeded to the chair of Medicine in Stockholm. Of course, good friend Professor Haquain Malmros of Lund is enthusiastic. Besides, the proud Swedes do not relish seeing the Finns and the Norwegians going ahead in a new line of research with no competition!

All the interested people in Oslo are agreed that they must join in the fund -- Gedde-Dahl of the Heart and Chest Diseases Society (the powerful former TB Society now strong for heart work); Ustvedt, Dedichen, Salvesen, C. Müller, and Blegen of internal medicine and cardiology; Nicolaysen of nutrition; Tønnes Ore, Paul Quale, and Julie Backer of statistics and insurance; Per Hanssen of the Geriatrics Society (and medicine at Stavanger); O. Torgersen of pathology; and E. Pedersen of

epidemiology. Also, we can count on support from Axel Strøm, now in a second term of three years as dean of the Oslo University Medical School, and Professor P. Owren, the hematologist.

You will understand that the three days in Oslo were busy. Ernest Klepetar and Edith joined me there (and have continued to travel with me since), so the Norwegian actuaries and insurance people increased the social as well as the professional doings. You may recall that the Klepetars joined us for the work in Naples in 1954.

A research program in Norway has several reasons for interest: (1) they have a very low mortality rate, especially in middle age, and coronary heart disease has not been a great problem until lately but now increases by leaps and bounds; (2) the parallelism between coronaries and the fat in the diet, with great changes in World War II and after, is striking; (3) there would appear to be big regional differences in the diet (fisher folk versus dairy farmers, etc.), but neither this nor the regional heart picture has been studied properly; (4) Norway has an excellent medical organization, a high frequency of autopsies, and has demonstrated ability to get fine population cooperation in medical surveys; and, finally, (5) the top people in all of the disciplines involved in such research can be counted on to pull in a team.

Denmark has a special place in my affections dating from my year with August Krogh in Copenhagen in 1930 and 1931, so it was good to greet there old friends and new -- Paul Brandt-Rehberg and the staff of my former headquarters at Juliane Maries Vej 32, all still appearing young through my bifocals; Professor Torben Geill and P. From Hansen at De Gamles By ("Old Town," a 2,000-bed home and hospital for the aged from which we in Minnesota can learn much); Dr. Carl Johan Møllenbach, the able deputy director of Health for Denmark, who is pushing hard for a heart research program with the Danish people; and many others. I was especially pleased to have all three of the professors of medicine -- Eric Warburg, Brøchner-Mortensen, and Møller -- turn up at my lecture and afterwards express great interest. Plans in Denmark are still nebulous, but I hope that Dr. Tybjaerg Hansen, of whom much is expected, will be in the picture. Dr. From Hansen and his wife, a G.P., hope to drive their new Citroen to join us in Yugoslavia in October to learn about field surveys.

Dr. P. Muntendam, director general of Health for the Netherlands, had arranged a fine conference for us with the right people at The Hague, where it was good to see my old friend Professor B.C.P. Janssen of Amsterdam (he first isolated thiamine when he was chief of the Ejkmann Institute in Java), J.M.L. Dols (often a comrade-in-arms in the Committees of WHO and FAO of the United Nations), van Eekelen, Den Hartog, F. S. P. van Buchem, and J. Groen (now professor of medicine in Israel). Dr. Louise Dalderup, who worked hard with the team in Calabria (southern Italy) last year, is much junior among these august professors, but she is full of steam to carry the ball for the projected research program for the Netherlands. Now to provide the details for a concrete plan! Like Norway, the basic medical organization is excellent; the leaders of the various

disciplines and organizations will work together; and there is a history of diet and heart disease frequency changing in parallel.

After all this and the great concourse of people (3,000 plus) gathered for the Third World Congress of Cardiology at Brussels, there was neither time nor energy for the sights of the World Fair, though one could admire the huge silver balls of the "Atomium," glistening in the sun by day and twinkling with lights by night, high above the exhibition buildings of some 50 nations laid out in a great park for the delectation of 30 million visitors in six months. Half of the Congress members are angry about poor accommodations, high prices, or just no place at all within twenty miles to stay.

Margaret arrived on Sunday morning direct from Minneapolis, with news that all was well at home (except for Little Rock, Quemoy, and the Near East), and the whirl of the Congress engulfed us. As usual, in such affairs, the scientific program was confusing, and we learned far more in private walks, talks, and hotel bedrooms than in the lecture halls. The joint meetings of the Research and Social Committees, which I had the responsibility for arranging, were fruitful and resulted in a report which may do some good in stimulating international research and the standardization of methods and research reporting.

So here we are in Bruges, seeing the sights in a gentle rain, which seems appropriate to the old town, dreaming of five hundred years ago when it was one of the greatest commercial centers of the world and Van Eyck, Memling, and Gerard David were painting their masterpieces. Nobura Kimura is with us. Last night we were guests, with Dr. S. Padmavati of New Delhi, of Professor Renee Pannier, who has a fine old home here, and tonight we dine with Martti Karvonen and a Belgian friend at Damme; the fag end of the Congress is still with us. Monday, we pick up the new car we bought in Brussels and hurry to Zagreb and the Yugoslav research job.

Drs. Henry Blackburn and Josef Brozek of our Minnesota staff will be there when we arrive, I hope, and Dr. Ratko Buzina will be rushing around with all the last-minute jobs to be done before leaving Zagreb for the field. Paul White will be with us a couple of days but cannot stay longer.

How the world has shrunk since the war! Even Moscow gets closer and sent 11 delegates from there and other parts of Russia to the Congress. We had a private lunch, as guests of the Whites, with the four members of the Russian Academy of Medical Sciences who were here.

I shall try to write again from Yugoslavia after the field operation gets running smoothly in high gear. In the meantime, all good wishes to you and all in Minnesota.

As ever,





Winchell McK. Craig, M.D.

Admiral of the Ocean Seas

UNLESS ONE WISHES to be a purist, pursuing antecedents back to the Pleistocene period and Lake Agassiz, it is fair to say that Minnesota never has been a maritime commonwealth and, hence, never has had a need for a navy nor, in fact, any means of accommodating one. Yet, the state of Minnesota does enjoy one distinction which no other state, regardless of long proximity to the oceans, can equal—it can claim as a resident the man who was the first physician from civilian life in the history of the United States Navy to attain the grade of rear admiral.

The man is Dr. Winchell McK. Craig, emeritus head of the Section of Neurologic Surgery in the Mayo Clinic and emeritus professor of neurologic surgery in the Mayo Foundation. In 1945, returning from the Philippine Islands to Pearl Harbor in Hawaii with a plane load of patients, Dr. Craig was met by a captain of the line who, after helping unload the casualties from the Navy plane, drew himself up and said sternly, "Sir, you are out of uniform." Dr. Craig, then a captain, was aware of his rumpled uniform and absent necktie, but he protested in vain as the line captain repeated the charge several times. Suddenly, the officer held out his hand and said smilingly, "Sir, take off that eagle from your collar and put on two stars. May I be the first to congratulate you on your promotion to the grade of rear admiral and flag rank."

The captain of the line, Dr. Craig later learned, had been sent down by headquarters to break the news to the first reserve medical officer to achieve such a distinction in the history of the Navy.

Dr. Craig, a native of Ohio, attended Ohio Wesleyan University and the Johns Hopkins University, obtaining the doctorate in medicine in 1919. Completing his internship at St. Agnes Hospital in Baltimore, he applied for and was awarded a fellowship

in general surgery in the Mayo Foundation in 1921. Every inclination the young man possessed guided him powerfully toward general surgery, but, when the opportunity arose for him to become a neurologic surgeon of the Mayo Clinic, he accepted it. He became head of the Section of Neurologic Surgery in 1946, a post he occupied until 1956, when he became a senior consultant in the specialty.

Testimony of the eminence achieved by Dr. Craig in his field is both convincing and abundant. Ohio Wesleyan University awarded him the honorary degree of doctor of science in 1937, and, in 1946, he was elected president of the Society of Neurological Surgeons. Members of the Harvey Cushing Society gave him the same honor in 1948, and, in 1953, he was chosen president of the Association of Military Surgeons of the United States. His colleagues in Rochester chose him as president of the Mayo Foundation chapter of the Society of the Sigma Xi in 1956, and he has been chairman of the American Board of Neurological Surgery, Inc. In March of 1957, he was invited to deliver the historic George M. Kober Lecture at Georgetown University, and, in both 1955 and 1957, at the request of the Surgeon General of the United States Navy, he served as one of the leaders of a flying expedition of specialists who lectured at American Army and Navy medical installations in the Far Pacific from Hawaii to Japan.

While he was in active service in the Navy from 1941 to 1946, Dr. Craig was chief of surgery at the United States Naval Hospital at Corona, California; chief of surgery in the United States Naval Medical Center at Bethesda, Maryland; and director of the graduate training program in the Bureau of Medicine and Surgery. He was awarded the Legion of Merit, the Naval Reserve Medal, and the Bronze Star.

Dr. Craig has served Ohio Wesleyan University

for many years as a member of the board of trustees, and he organized physicians in all parts of the country who had taken their premedical work at Ohio Wesleyan to create the Rice Foundation for premedical counseling and the furtherance of scientific education.

It is told that Cincinnatus, retired military leader and consul and dictator of Rome, living quietly on his farm near the Tiber River, was sent for by the Roman Senate, which regarded him as the only Roman who could avert an impending military disaster. He threw down his spade and took up arms once again and saved the day for the Romans, returning to his fields when the danger was past. The tale has its modern counterpart, for Dr. Craig, after almost a lifetime devoted to the naval affairs of the country, recently accepted the post of director of civil defense for the city of Rochester and Ohnsted

County. In that capacity, he is now organizing programs to deal with disasters, a task involving not only medical management but also close liaison with state and regional directors, so that a tightly integrated, efficient, over-all program for the safety and care of all the citizens of Minnesota will be available instantly in time of catastrophe.

Dr. Craig was married in 1928 to Miss Jean Katherine Fitzgerald. Nearly every seasonable week end when the waters are open, Dr. and Mrs. Craig alternate at the wheel of the "River Queen," a twin-engined houseboat bearing a flag with the two stars of a rear admiral. At other times, Dr. Craig is busy with his collection of early American hand guns, on which he has spoken extensively, or off on an excursion into genealogy, tracking down some elusive collateral descendant of the first Craig to set foot in the New World in 1682.

Principles of Research in Biology and Medicine, by DWIGHT J. INGLE, Ph.D., 1958. Philadelphia: J. B. Lippincott Co. \$4.75.

This book is directed to "students who are preparing for or are beginning research in macrobiology and medicine." The author is professor of physiology, The Ben May Laboratory for Cancer Research, University of Chicago. Professor Ingle admits that the principles discussed are elementary but hopes that further study will be inspired. Be all that as it may, the information given briefly and simply will be useful for anyone beginning investigative work and also for all contributors to, or readers of, medical literature.

Principles of research, as here set down, should be understood by all doers, reporters, and readers of work in biology and medicine. The planning and accomplishment of experiments or simply the description of a case, a disease, or a method and explanation of results should accord with logic, probability, and veracity. Editors should be critical of manuscripts submitted for publication; society officers should be selective in planning programs; and readers should scrutinize doubtfully and skeptically all journals. Much of the work done, many talks given, and articles published would not be finished, spoken, or printed if the perpetrators and recipients had made use of the scientific methods and criteria presented by Professor Ingle. This book sharpens and brings up-to-date Claude Bernard's "Introduction to the Study of Experimental Medicine."

JAMES B. CAREY, M.D.



Introduction To Clinical Endocrinology, by A. STUART MASON, M.D., 1957. Springfield, Illinois: Charles C Thomas, 192 pages. \$4.50.

The author attempts to present clinical endocrinology in terms of applied physiology and therefore has more information on hormones than on endocrine glands. No attempt is made to include references to the literature in the interest of simplicity. A short reading list is included.

In the chapter on the thyroid, thyrotoxicosis is stated to be a psychosomatic disorder, the basic etiology of which is unknown. Although emotional stress is said to be the most important precipitating agent, the reader might ask why the most adverse emotional environment of war and combat did not more frequently initiate hyperthyroidism. The avidity of the thyrotoxic gland for iodine, the direct variation of the circulating hormone with the severity of the disease, and the absence of any qualitatively abnormal hormone production are noted. Clinical manifestations are well described with a minimum of laboratory procedure; chemical formulas of the known hormones are included.

This volume would be a valuable addition to any practicing physician's bookshelf because it is concise and free from complicated theories, reviews in readable form the physiologic basis of the clinical endocrine entities, and also includes consideration of treatment.

C. A. MCKINLAY, M.D.

Clinical Enzymology, edited by GUSTAV J. MARTIN, Sc.D., 1958. Boston: Little, Brown & Co., 241 pages. \$6.00.

This volume is a combination of a useful presentation and careful assessment of information about parenteral administration and the diagnostic use of enzymes together with much less useful effort "to incorporate the field of clinical enzymology into a greater structure, into natural philosophy."

The book is comprised of 7 chapters, 3 of them by the editor. Probably the most useful chapter to the clinician is that of Tanyol, Swain, and Beiler on the parenteral use of enzymes in medicine. They recognize the newness of the field and deal adequately with those enzymes about which appreciable information is available. Emphasis is given to trypsin, the efficacy of which as an anti-inflammatory agent, particularly in thrombophlebitis, appears to be established. Chymotrypsin, streptokinase, desoxyribonuclease, hyaluronidase, and cholinesterase are briefly discussed. Literature coverage includes only a few references after 1956.

Unfortunately, the 40-page chap-
(Continued on page 26A)

Section on PAIN

Foreword

The current paper, "Management of Pain in General Practice," by Dr. John J. Bonica, is of special interest to every physician because pain affects everyone and, hence, constitutes a major challenge in the matter of control.

JOHN S. LUNDY, M.D.

Management of Chronic Pain in General Practice

JOHN J. BONICA, M.D.

Tacoma, Washington

DESPITE THE MANY ADVANCES which have been made during the last quarter of a century in medicine, the management of pain remains one of the most difficult and often vexing phases of medical practice. This is not only because it is the leading symptom of many diseases and, therefore, constitutes one of the most frequent reasons why patients seek their physician's counsel but also because it is often a complex and distressing problem. It is obvious, therefore, that the proper management of pain is, from the patient's standpoint at least, the most important obligation and one of the main objectives of every physician.¹

The general practitioner, caring as he does for the majority of patients with pain as a presenting symptom and usually being the first to see these patients, has among all physicians the most important and heaviest responsibility for their proper management. The purpose of this presentation is to discuss briefly some aspects of the pain process, indicate what methods are presently available in the treatment of chronic pain, mention briefly some of the pain syndromes, and indicate the role of the general practitioner in their management. Although some of the therapeutic procedures which will be mentioned are obviously outside the sphere of general practice, appreciation of their indications, advantages, limitations, and disadvantages by the fam-

ily physician is essential to fulfill his role as coordinator of treatment. Obviously, many painful disorders can be quickly remedied with simple medical means. In this presentation, we are not concerned with this type of pain but with persistent pain.

WHAT IS PAIN?

In order to understand some of the principles involved in managing patients with pain and the proper therapeutic application of various methods, some concept on the nature of the pain process is essential. Most people have great difficulty in defining the word "pain." This is so because pain is a highly personal affair, entirely subjective in nature, and a complex physiopsychologic phenomenon which almost defies inquiry. Some persons believe that the total pain experience is composed of the perception of pain and the associated emotional reaction and effective states.² The perception of pain, like the perception of other sensations, such as temperature and touch, is a neurophysiologic process with special structural, functional, and perceptual properties and is accomplished by relatively simple and primitive neural receptive and conductive mechanisms. It is measurable and constant, although it can be modified by drugs and psychic factors and completely obviated by interrupting its pathways by chemical nerve block or surgical means. The reaction to pain, on the other hand, is a complex physiopsychologic process which involves the cognitive functions of the individual. It represents the emotional and physiologic expression resulting from the

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perception of pain. It is what the individual feels, thinks, and does about the pain he perceives and what it means to him in the light of his past experiences.

Although this artificial dichotomy of the pain experience has proved useful to some in studying and understanding it, there probably is no such a thing as a pure sensation of pain separate and distinct from the influence of reaction. We believe, as do many others,³ that the essential part of pain is awareness, and no other sensation or experience can be termed "pain" unless it is felt as such. Moreover, so many neuronal influences modify the input from the pain source before it reaches awareness that central perception of pain can be considered the result of many different impulses registered and interpreted into a unit sensation which is greater than its constituent parts.⁴ Thus, while the original sensation may be considered the same for all individuals, as soon as the process begins, it is no longer a pure sensation. I believe that the quality of feeling experienced by the patient, his complaint, and his physical and mental responses are manifestations of the reactions and are the most relevant of the pain experience. These are among the most important and fundamental facts about pain. They must be accepted with their full implication if the physician is to be successful in managing patients who are suffering with intractable pain.

SOME CHARACTERISTICS OF PAIN

Noxious stimulation produces pain which differs in its characteristics in accordance to the structure involved. The characteristics of pain of special interest to the clinician include quality, intensity, duration, and extent. It is well known that injury to the superficial somatic structures produces pain which has a sharp quality, is well localized, and is felt quickly, while deep pain is described as a dull, aching, sickening discomfort which is poorly localized.

In addition to pain, other responses to noxious stimulation must be seriously considered in treating it. These include local tenderness, reflex skeletal-muscle contraction, vasospasm, hyperhidrosis, and, frequently, a disturbance in the spinal cord. The degree of these responses depends upon the intensity and duration of the stimulus. The more intense the stimulus and the longer the time since the injury, the more likely it is that these associated phenomena will occur and the more intense they become. These responses frequently act as new sources of noxious

stimulation which initiate a vicious circle that may become self-perpetuating.

Several other important characteristics of pain must be kept in mind. Pain is rarely constant in intensity for any protracted period of time. The intensity of pain arising from a lesion is independent of the size of lesion, and, when two or more sources of pain stimuli exist coincidentally, perception of pain is monopolized by the most intense. Perhaps the paramount factor in determining the intensity of pain and suffering is the significance of its source. If there is no worry or other distressing implication regarding its source, the pain is comparatively well tolerated. Pain of long standing, whether moderate or severe, produces physical and psychologic depletion which varies widely between individuals and may be evidence of basic personality differences.⁵ Patients with chronic pain have a gradual but complete alteration in the attitude toward their environment. Consequently, they have no other interest, and the pain becomes a consuming problem which completely dominates their lives. In such cases, interruption of pain pathways cannot be hoped to solve the problem entirely. In many instances, the problem is much more complicated and necessitates a long-term application of psychotherapeutic and rehabilitative measures as well. General debility, malnutrition, fatigue, anxiety, or mental turmoil decreases further the reaction threshold, so that the pain is more severe and more difficult to treat. Lack of sleep is particularly important in this respect.

PAIN PATHWAYS

Pain pathways are mentioned because a thorough understanding of these pathways is essential in properly applying some of the methods used to control persistent pain. The nervous pathways of pain may be said to be organized into three distinct units or relays: (1) the first relay, or peripheral sensory neurons, (2) the second relay, or connector or internuncial neurons, and (3) the third relay, or sensory neurons. The location of the pathways, particularly in the spinal cord, is most diffuse, a point of great importance to the neurosurgeon who attempts to interrupt the pathways by chordotomy.

METHODS OF PAIN CONTROL

It is apparent that a basic orientation and evaluation in regard to the totally functioning human being are needed in such a complex process as pain. From a standpoint of approaches to treat-

ment, it is desirable to differentiate that which is primarily structural, primarily physiologic, and primarily psychologic. When there is a significant psychic factor, as in many psychophysiologic disorders, or when pain is related to personality factors but without demonstrable physiological changes, treatment of the psychologic problem becomes paramount. In these cases, it is incumbent on us to treat the underlying psychophysiologic condition, and the fundamental methods of psychiatric management must be considered. The same may be said about the management of patients with certain psychiatric conditions in which pain may be a prominent symptom. Since a discussion of psychiatric technique is beyond the scope of this paper, nothing more will be said except to re-emphasize the importance of this method in managing patients with the intractable pain. An excellent dissertation on the subject has been written by Ripley.⁶

Now let us focus our attention on patients with pain of structural etiology and on those with pain accompanying altered physiologic function without structural changes. Although psychologic support is very useful in helping these patients, the main treatment is directed toward the elimination of the primary disease. This may be accomplished medically by means of antibiotics, antispasmodics (curare), vasodilators, vasoconstrictors, and so forth or by surgical extirpation or by treating the disease with physical methods, such as roentgen therapy and physical therapy. In patients with pain due to self-limiting medical disorders or to diseases in which surgical extirpation is indicated, the solution of the pain problem is usually clear-cut and relatively simple. However, in patients with protracted pain, the cause or mechanism of which cannot be ascertained or eliminated, the problem is often very difficult from a therapeutic as well as a diagnostic standpoint. Such cases require a well-planned attack that is based upon certain fundamental principles which must be followed if optimum results are to be achieved.

BASIC PRINCIPLES OF MANAGEMENT

In instances of intractable pain, diagnosis and localization of the source of the pain usually require a thorough and detailed examination of the patient and a correct interpretation of medical, neurologic, radiologic, and laboratory data. It becomes immediately apparent that the proper management of such patients requires a great deal of time and effort, more than some practitioners are willing to spend. Unless the physi-

cian is willing to devote the necessary time to the problem, he cannot hope to achieve the best results. In fact, he may do more harm than good. A proper diagnosis is essential for the successful management of pain in any patient, but particularly in those with intractable pain. This can only be obtained by a detailed history of the pain in its three phases or periods: onset, course, and present status. The circumstances contributing to the cause of the pain and its location and distribution, quality, intensity, and duration should be ascertained. The factors which aggravate and relieve the pain are especially important.

Proper examination of the painful region and interpretation of the findings require consideration of the mechanism of pain. Frequently, the pain is referred to an area away from the site of the disease or injury. Examination of the painful region should be followed by a general physical examination. Since many pain syndromes involve the muscular and/or nervous system, simple orthopedic and neurologic examinations should always be done. Study of the blood, urine, and cerebrospinal fluid and roentgenographic studies often provide information without which a diagnosis cannot be made.

Since, to properly appraise pain, it is essential to know something about the patients' personality, background, intellectual status, and emotional reaction, a mental examination is necessary.

After a diagnosis has been made and the mechanism of pain is determined, it is essential to carefully plan the best course of treatment. In determining which procedures should be used, many factors must be considered, such as cause of the pain, its site, its type and mechanism, its intensity, and its probable duration. In addition, it is necessary to consider the nature of the disease causing the pain and the age of the patient, his physical and mental status, his life expectancy, and his obligations to his family and community. Also, thought must be given to the methods which are locally available and practical under the circumstances. However, the physician should not hesitate to recommend a form of pain control available elsewhere if it is superior to the methods locally available. In case of doubt, it is advisable to explain the advantages, disadvantages, and limitations of each method and let the patient and his family make the decision.

Frequently, management of pain problems requires the application of several therapeutic methods. There has been as yet relatively little

clinical exploitation of a multipsyche approach to pain control by which several well-chosen combinations of therapeutic methods are applied, each specific for certain desired effects. This procedure is usually much more effective and far more satisfactory than altering the reaction with addictive analgesics.

Since persistent pain exacts a heavy price in the form of physical and mental depletions, it is most important to provide complete relief at the earliest possible date. Although the systemic analgesics are most frequently used in treating severe intractable pain, it must be realized that they seldom completely relieve the discomfort but merely make it more tolerable. For this reason, the early use of some method to interrupt pain pathways should be considered before tolerance and addiction to analgesics develop.

PSYCHOLOGIC SUPPORT

All patients who experience moderate to severe chronic pain require psychologic support and moral encouragement. The first positive step in relief of intractable suffering occurs when a physician manifests his responsibility and willingness to properly discharge his obligations for the care of the patient. In addition to the benefit made possible by modern science, the physician should bring the patient a sympathetic understanding, kindness, cheerfulness, and reassurance. Since patients are quick to sense an attitude of defeatism or a lack of interest, the physician should do all he can to instill confidence into the patient and a sense of security based upon the conviction that all will be done to relieve his suffering. The general practitioner, by virtue of the proper rapport and confidence which he has cultivated in the patient, is best qualified to carry out this phase of management.

Measures to support the patient physically are also essential not only to compensate for physiologic depletions but also because malnourished patients cannot tolerate pain as well as those in good physical condition. Diet should be high in protein, vitamins, and calories. If anemia is present in spite of proper therapy, transfusions should be given. In addition, good hygiene and competent nursing care together with rest and sufficient sleep are necessary.

ANALGESICS

Clinically, the most commonly employed methods in the management of persistent pain involve the use of systemic analgesics and hypnotic drugs to reduce the symptoms of or modi-

fy the reaction to pain. In selecting the type of analgesia, the quality and intensity of pain are the most important considerations.

Nonaddictive analgesics. Mild pain can be adequately controlled with nonaddictive analgesics, such as aspirin alone and in combination with a hypnotic. These drugs owe their effectiveness almost entirely to their ability to raise the threshold of pain perception, since they have little effect upon the reaction or mood. Combination with a barbiturate or with chloral hydrate is particularly advantageous because, in many instances, the sensation which is termed "pain" by the patient represents in part a manifestation of fear or anxiety. Moreover, the hypnotic drugs assure sleep—a most important consideration in these patients. The more significant recent observation concerning the use of these drugs is that they are as effective in doses of 0.6 gm. or 10 gr., as in much larger doses. Moreover, the addition of sodium carbonate is of little value because it does not hasten the absorption of aspirin, as alleged by some.

Addictive (narcotic) analgesics. When pain becomes severe and persistent and other methods are contraindicated or not available, the proper use of narcotic drugs is of great benefit to the patient. The role of these drugs is too well known to warrant further discussion except to emphatically state that their effectiveness, low cost, and ease of administration—very desirable qualities in any drug—are conducive to improper treatment. This is particularly true in cases of intractable pain of undetermined origin, when the busy physician tends to resort to the easier and less time-consuming method of administering these drugs. The undesirable side effects on the respiratory, gastrointestinal, genitourinary, and central nervous systems as well as the problem of addiction must be considered when narcotics are employed for a prolonged period of time.

The misuse of narcotics is without doubt one of the most serious and often disastrous areas in clinical medicine. The physician may be entrapped into committing such an error by a humane, though unconsidered, decision to keep the patient from suffering. Administration of narcotics in patients with chronic pain is a frustrating short-lived type of kindness. Such sense of mistaken humanitarianism is inevitably productive of tolerance and other phases of addiction and is really a great disservice to the patient. This is so because, with continued use of the addictive analgesics, tolerance of the analgesic

action develops and eventually an impasse is reached in which the patient's daily narcotic requirements are high, and yet the alleviation of pain is inadequate. In addition to being medically unsatisfactory, this situation is fraught with the possibility of social and economic disaster for the addicted patient and his family.

By far the most important factor in the proper management of chronic pain is the performance of the physician. If the practitioner views pain traditionally, as merely a symptom of physical disease instead of considering the whole person, and further disregards the emotional changes that arise with pain, proper management is impossible. Such a physician finds it necessary to administer narcotics frequently and, because he offers nothing else, tends to encourage their use and to make them essential to his patients. On the other hand, the attentive physician who offers his patient sympathetic understanding, kindness, cheerfulness, steady psychologic support, and realistic perspective realizes similar results without resorting to frequent use of addictive drugs. He prescribes such drugs only as a specific part of the relationship between the physician and the patient and not as a substitute for that relationship.

In patients in whom, either due to the nature of the disease or other circumstances, pain must be controlled with narcotics, design for their use requires certain considerations. Although morphine is the time-honored drug, there are patients in whom this drug fails. For every patient who must be on a narcotic regimen in the face of intractable pain, there is some opiate or opioid which is superior to any of the others. Its supremacy depends upon complex qualities besides analgesia, and the final criterion in any case is the drug that best satisfies the patient. His reaction to the drug represents a composite of analgesia, pleasant modification of mood, freedom from undesirable side effects and hangover, and many other factors. It is essential, therefore, to plan a systematic search for the most suitable drug. This is best accomplished by the rotation system of administering a different drug every twenty-four hours and then having the patient decide which is the most effective. It is best to do this without the knowledge of the patient or the nurse administering the drugs in order to avoid bias.

After ascertaining the optimum drug, the optimum dose must be determined. To do this, several different doses of the drug are prepared in syringes which are coded and then given to

the nurse without divulging the specific amounts in each syringe. This is also done to avoid bias on her part. Occasionally, one or two doses of a placebo are also included to ascertain the degree of placebo reaction. The nurse is requested to observe and record accurately the results after each injection. The smallest dose that provides comfort with minimum side effects is selected as the optimum dose. Obviously, this prolonged search for the optimum drug and dose cannot be used in acute pain.

In order to delay addiction and tolerance, the narcotics should be given at irregular intervals. Sufficient amounts of the drug should be given often enough to obviate periods of severe pain. One of the things that will hasten psychologic dependence is failure to use enough of the drug to achieve the desired effects. This situation can be avoided by being sure that the dose is adequate and by giving the drug as soon as pain occurs.

In patients receiving large doses of narcotics for chronic pain, care must be exercised in carrying out a neurosurgical operation or nerve block procedure. Sudden elimination of pain by interruption of its pathways may result in respiratory depression or even apnea. The use of narcotic antagonists, such as nalorphine and levallorphan, may be effective in counteracting the depressant effects of addictive analgesics. It should be stressed that narcotics infrequently abolish pain but merely make it more bearable and, what is more important, acceptable. Therefore, it is essential to consider the early use of some method to interrupt pain pathways by chemical-surgical means. When this is done, there is reason to expect that the patient may have some actual freedom from pain as well as from the discomfort of neurosurgical operations.

Hypnotics, sedatives, and tranquilizers. The fear of pain and its other affective reactions may be modified by the use of drugs other than analgesics. Properly employed barbiturates and the tranquilizing agents are very effective in decreasing the need for narcotic analgesics. The mechanism of their action is undoubtedly on the reaction phase of pain. Barbiturates, like the opiates, alter the psychic modification of pain. In this manner, concern, anxiety, fear, and significance are detached from pain. Wine or other alcoholic beverages to relieve pain and produce euphoria may be indicated as a method of management. It should be mentioned that Thorazine should not be used in patients who have received very large or known quantities of barbiturates,

narcotics, or alcohol. Because it potentiates hypotension produced by spinal or extradural anesthesia, it should never be used in conjunction with nerve blocks that produce excessive vasomotor paralysis.

Placebos. Although much neglected, and often scorned, placebos constitute a valuable group of drugs which have their effect on the central nervous system. It has been found that fully one-third of patients with severe steady postoperative pain were relieved with saline or lactose placebos. The mechanism by which placebos have relieved pain is not definitely known, but they probably involve the effects of suggestion on the reaction phase of pain.

There are two absolute requisites for success in the use of placebos: (1) the patient must believe that he has been given a drug intended to relieve his pain and (2) the nurse or attendant who administers the drug must share in that belief. A very effective way in prescribing a placebo is to include it in a series of analgesics, as previously described.

NEUROSURGICAL OPERATIONS

For patients having severe, intractable pain and for whom palliative procedures cannot be done or have been ineffective and who are still in fairly good health, prolonged relief can sometimes be obtained by neurosurgical operations. Although this form of therapy is often considered a last resort because of its serious and radical nature and its irreversible effects, it should not be delayed unnecessarily until the patient is hopelessly addicted to narcotics.

From the discussion of pain pathways, it is apparent that these can be surgically isolated from central nerve roots and autonomic nerves or in the neuraxis by section of the spinothalamic tract in the spinal cord, medulla, mesencephalon, or at their way stations in the thalamus. Conscious perception of pain may be altered by resection of the postcentral cortex or by division or resection of various portions of the frontal lobes.

Peripheral neurotomy. The simplest and least useful operation is section of a peripheral nerve, which may be used to control localized pain of the extremities due to gangrene, painful arthritis of the hip, and tic douloureux involving small peripheral branches.

Rhizotomy. This procedure constitutes interruption of sensory fibers at preganglionic levels and is the neurosurgical technic of choice in the management of pain of the head and neck, such

as occurs with trigeminal neuralgia, cancer, and other chronic disorders. It can also be used to localize intractable pain in the trunk, providing only a few segments are involved and the pain is not likely to spread. It is particularly useful in segmental pain due to compression by fractured vertebra secondary to cancer, tuberculosis, or osteoporosis and also in patients with arthritic spurs.

Since this procedure results in loss of all modality or sensation, it is not suitable for pain in the extremities, because loss of proprioception and touch sensation produces an essentially useless limb. The disadvantage inherent in rhizotomy, besides the fact that it requires craniotomy or laminectomy, is that the pain may spread beyond the denervated areas as the lesion progresses.

Sympathectomy. This operation is very useful in controlling pain of vascular and purely visceral origin. Its value in patients with angina pectoris who cannot be relieved by medical means is well known. Splanchnicectomy results in interruption of pain pathways of the upper abdominal viscera and is useful in managing patients with intractable pain due to chronic pancreatitis, biliary disorders, gastrointestinal disease, and intestinal dyskinesia. Sympathectomy is also of value in idiopathic nephralgia and dysmenorrhea but is not effective in patients with pain originating in the bladder, prostate, or cervix uteri where afferent fibers run in the sacral nerves.

Sympathectomy is of great value in patients with major causalgia and other reflex sympathetic dystrophies and almost always relieves the pain permanently. Sympathectomy is also effective in relieving pain due to peripheral vascular insufficiency, such as produced by Raynaud's disease, arteriosclerosis, thromboangiitis obliterans, and other vasospastic disorders.

Spinothalamic tractotomy. The anatomic arrangement of tracts in the spinal cord and brain permits section of pain and temperature fibers without disturbing other functions to a significant degree. This operation is the most effective procedure for the relief of severe, intractable pain due to cancer, injuries to the cauda equina or lower segments of the spinal cord, arachnoiditis, tabetic crises, phantom limb pain, and/or major neuralgia that follows amputation.

The best results are obtained with high thoracic anterolateral chordotomy for pain in the lower extremities and pelvis. To relieve pain in the upper thorax or arm, the tractotomy must be done at the first or second cervical level. For

patients with pain in the shoulder and neck, it is necessary to interrupt the spinothalamic tract in the medulla or at higher levels. Tractotomy in the mesencephalon is feasible but is followed by disagreeable paresthesia in the zone of analgesia, high mortality, and a tendency for analgesia to fade.

Complications that follow chordotomy are primarily due to interruption of motor tracts and include vesical dysfunction, fecal incontinence, weakness of the limbs, hypotension, sexual dysfunction in males, and respiratory paresis or paralysis with dysesthesia. Also, radicular pain, paresthesia, and other sensory disturbances occur.

Cerebral operations. Interruption of the fibers projected from the thalamus to the frontal and supraorbital cortex or resection of these areas suppresses or modifies the reactive expression of pain and awareness of suffering without affecting perception of pain. Prefrontal lobotomy is a relatively new tool in the armamentarium of the neurosurgeon in treating intractable pain. This procedure has had enthusiastic acclaim in some quarters but must be considered as the court of last appeal.

This procedure apparently benefits the patient with intractable pain in two ways: (1) it alters his pain pattern and his appreciation of pain, and (2) it alters his personality and consequently relieves him of the anticipation of death.⁸ Following this procedure, narcotics can be decreased or discontinued, and, although withdrawal symptoms occur, they are mild.

Bilateral prefrontal lobotomy almost always produces quite a striking change in the patient's personality. There is a peculiar apathy, and normal human qualities of compassion, restraint, and moral values are blunted. It has been said that "the patient has lost his soul," but this may be preferable to entrapment by intolerable pain and drug addiction. On the other hand, these effects sometimes complicate rather than simplify the management of these patients. Moreover, it is not unusual for the pain to return with the passage of time.

In view of these serious disadvantages, prefrontal lobotomy should not be considered for conditions that can be taken care of adequately with a properly executed chordotomy, rhizotomy, or sympathectomy. It should be reserved for patients with severe pain in whom other measures have failed or cannot be done. Since unilateral lobotomy is followed by fewer undesirable effects, it is best to perform the operation on one side, and, if the pain returns, section of

the opposite side can be carried out later. It has been noted that a two-stage operation relieves pain as effectively but with less psychic deterioration than occurs after the one-stage bilateral operation.

NERVE BLOCKS

In the management of patients with persistent pain, nerve blocks can be used as diagnostic, prognostic, prophylactic, and/or therapeutic measures.¹ Diagnostic blocks are performed to secure information concerning the mechanism of pain and in determining the pain pathways. In this way, it may be used effectively to aid in differentiating diseases. Occasionally, a block is performed to determine what the patient's reaction will be to a situation in which the pain pathway may be interrupted. Because of its reversible action, this method is useful to prognosticate the effects of surgical section and, thus, facilitates proper selection of patients for neurosurgery. Moreover, such prognostic blocks afford the patient an opportunity to experience the numbness and other effects that follow interruption of somatic pathways.

The beneficial therapeutic effects of nerve blocks are brought about by interruption of pain pathways and abnormal reflex phenomena and production of vasodilation. Analgesia consequent to interruption of pain pathways not only affords the patient relief and comfort but permits the application of other therapeutic measures, which would otherwise be difficult or even impossible to use. Furthermore, analgesia allows time to prepare the patient more adequately prior to surgical operations. Temporary block of abnormal reflex phenomena can produce prolonged benefit by breaking up the so-called vicious circle of a number of painful disorders. In conditions, such as reflex sympathetic dystrophy and post-traumatic vasospastic disorders, an abnormal number of afferent impulses originating from the site of trauma or infection sets up an abnormal state in the spinal cord which spreads to involve autonomic and somatic efferent components, resulting in abnormal vasospasm, increased sudomotor, and other sympathetic functions as well as skeletal muscular spasm. These, in turn, act as a new source of noxious stimulus which further aggravates the disturbance in the spinal cord, thus setting up a vicious circle. Interruption of the vicious circle anywhere along its course with local anesthetics is frequently followed by improvement which outlasts the block by hours and even days.

In general, temporary blocks are produced by aqueous solutions of local anesthetics and are used for diagnosis, prognosis, and prophylaxis and also for therapy of certain self-limiting diseases and reflex disturbances. Prolonged blocks are produced by injecting neurolytic agents, such as phenol and alcohol, and are usually reserved to control severe, intractable pain in patients in whom neurosurgical interruption is not feasible or those who refuse operation.

Any peripheral nerve—whether cranial, spinal, or autonomic—can be approached with a needle and its function suspended. Moreover, the interruption can be effected at various sites along the course of the nerves. Proper decisions as to the optimum site of injection require thorough knowledge not only of the anatomy of the involved pathways but also of the mechanism producing the pain. All nerve block techniques are useful and have their own peculiar indications and disadvantages.

Local block. Physicochemical interruption of sensory pathways may be produced at their endings in the periphery by infiltration or topical application of local anesthetic agents. This method is particularly useful in painful states initiated and/or perpetuated by so-called trigger areas in somatic structures. These trigger areas develop consequent to accidental or surgical trauma, infection, and other disorders and act as a constant focus of irritation which continuously bombards the central nervous system with afferent impulses, thus creating an abnormal state of activity in the internuncial centers of the spinal cord. With local block, the vicious circle is interrupted by blocking the noxious impulses almost at their source.

In the majority of the instances, injection of the focus, which not infrequently is situated away from the area of pain reference, is followed by a disappearance of pain, muscle spasm, and vasomotor disturbances for much longer periods than the duration of anesthesia. It is essential, however, to accurately locate and inject the trigger area. In this connection, it is important to note that posttraumatic and postoperative scars may act as trigger areas even when not painful or tender. Such areas may also be located in the tonsils or periodontal structures.

Local block is also useful in diagnosis and treatment of acute and chronic cutaneous and musculoskeletal painful disorders, such as ligamentous sprains, fractures, bursitis, tendinitis, epicondylitis, peri-arthritis, some forms of arthritis, low back pain, acute torticollis, fibrositis,

and a great variety of myofascial syndromes with trigger mechanisms, such as scapulocostal and scalenus anticus syndromes.

Peripheral somatic nerve block. Block of cranial and spinal nerves is indicated in the management of neuralgia, which we define as pain of any type along the distribution of a nerve or nerves. Since this condition is usually a symptomatic expression of neuropathy that results from inflammatory, circulatory, toxic, degenerative, metabolic, or neoplastic disturbances in the nerves, sensory ganglia, or central nervous system, it is essential to attempt to eliminate the cause before therapeutic blocks are considered.

Sympathetic block. Temporary interruption of sympathetic pathways is indicated in peripheral vascular disease, reflex sympathetic dystrophies, and visceral pain. In the acute phase of these conditions, sympathetic blocks are valuable not only as diagnostic-prognostic procedures but also as definitive therapeutic measures. In chronic disorders, temporary sympathetic blocks are useful as diagnostic-prognostic procedures. Prolonged interruption is best effected by surgery, although, in poor risk patients, alcohol blocks may be indicated.

Peridural block. This procedure is one of the most useful techniques in managing severe persistent pain of the trunk and lower extremities. By inserting a continuous catheter, the duration of the block can be extended for hours, days, or weeks and, thus, increase the usefulness of this technique. Since it effects interruption of somatic and sympathetic fibers, it may be used when block of both pathways is indicated, such as obtained in vasospasm of peripheral vascular disease, painful phantom limb, acute pancreatitis, biliary colic, acute cholecystitis, renal and ureteral colic and other severe visceral disorders, multiple rib fractures, and fractures of the spine, pelvis, and lower extremities. In certain patients with severe, intractable cancer pain involving the lower portion of the body, continuous peridural block for a number of days is of great value not only as a prognostic procedure but also as a method of providing respite and preparing the patient for more radical procedures.

Subarachnoid block. Single dose or continuous subarachnoid block with local anesthetic agents may be used as diagnostic, prognostic, or therapeutic measures in managing pain of the abdomen and lower extremities. The indications are the same as for peridural block.

Subarachnoid alcohol block, when properly used, produces a chemical posterior rhizotomy

that compares favorably with surgical section. It is particularly useful in relieving pain of cancer caused by pressure of somatic nerves or nerve roots as produced by metastatic lesions of the vertebrae and tumors in the paravertebral regions. The duration of pain relief varies from several weeks to many months and, sometimes, years, with an average duration of three to five months.

OTHER METHODS

In addition to the foregoing methods, a number of other procedures may be used alone or as adjuncts to these methods. These include physical therapeutic procedures, radiation therapy, and the use of endocrine substances and chemotherapeutic agents. Since a detailed discussion of these methods is beyond the scope of this paper, they are merely mentioned for the sake of completeness.⁹

Physical therapeutic procedures are frequently employed as adjuncts to surgical, orthopedic, neurosurgical, or anesthesiologic methods. The value of the local application of heat in traumatic or inflammatory disorders involving bursae, joints, and bones has been long appreciated. This method is extremely useful in contusions, strains, sprains, synovitis, muscle spasm, arthritis, fibrositis, and several other musculoskeletal disorders. Occasionally, cold is used as an adjunct in the management of pain secondary to acute circulatory insufficiency and that due to sprains and contusions and certain inflammatory disorders. The effectiveness of these and other physical therapeutic techniques, including the local application of ultraviolet radiation, the use of ion transfer, massage, and exercise are too well known to warrant even brief discussion.

Roentgen therapy is occasionally employed in treating such painful inflammatory diseases as furuncles, carbuncles, sinusitis, parotitis, thyroiditis, and thrombophlebitis, but its value has diminished in recent years. Herpes zoster and various other forms of radiculitis as well as neuritis and other neurologic disorders are sometimes treated successfully with this form of therapy. Roentgen therapy has also been used in managing bursitis, peritendinitis, arthritis, peri-arthritis, epicondylitis, and numerous other musculoskeletal disorders. Without doubt, the greatest use of roentgen therapy in pain control is in patients with neoplastic diseases. Despite the fact that the effects of radiation therapy on pain are often unpredictable, relief is sufficiently striking in many cases to warrant trial. In addition

to producing comfort, it frequently attenuates the growth and, thus, reduces toxicity and enhances systemic improvement, with consequent gain in weight and strength and improvement of well-being and general outlook. Other palliative benefits consist of repression or healing of ulceration, decrease or complete control of hemorrhage, healing of metastatic bone lesions and repair of certain pathologic fractures, suppression of cough and dyspnea in lung and mediastinal metastasis, retardation of localized and generalized metastasis, and prolongation of life.

The patients most likely to benefit from roentgen therapy include those with metastasis to bones from tumors of the glandular organs, particularly those from the breast, prostate, lung, kidney, thyroid, testis, or uterus. Roentgen therapy also helps some patients with pulmonary metastasis from seminoma, hilar metastasis, solitary metastasis to the lung, carcinomatous pleurisy, and metastasis to the skin. Occasionally, the pain of liver metastasis can be relieved with x-ray therapy. Pain due to inoperable carcinoma of the cervix, urinary bladder, kidney, or lung (particularly a pulmonary sulcus tumor) and Ewing's tumor can be relieved with roentgen therapy. With some of these lesions, roentgen therapy is combined with either surgery or endocrine therapy. If pain is so severe that radiation therapy is difficult, a preliminary nerve block of the painful site will afford sufficient relief to facilitate x-ray treatment.

The value of corticoids, cortisone, hydrocortisone, ACTH, and other steroid compounds in the control of pain associated with arthritis, bursitis, and various other musculoskeletal disorders is too well known to warrant further discussion. The same may be said of phenylbutazone. Steroids are also useful in treating multiple myeloma of the bone. Certain endocrine substances effectively relieve pain in some patients with cancer. Androgens and estrogens in breast cancer and estrogens in cancer of the prostate are known to cause regression of the tumor and provide dramatic relief of pain. Nitrogen mustards have been helpful in certain lymphoid neoplasms, particularly Hodgkin's disease, lymphosarcoma, and leukemia. Some cases of thyroid metastasis have been successfully treated with radioactive iodine, and, recently, radioactive iron has proved effective in the treatment of cancer of the prostate. Castration, either by surgical removal or by radiation therapy, has proved effective in causing regression of advanced breast cancer and cancer of the prostate. These pro-

cedures not only cause the primary malignancy to regress but frequently cause metastatic lesions to decrease or completely disappear, with consequent dramatic relief of pain and improvement of the patient's general condition. Whenever these agents are indicated, they should be used early before resorting to continuous narcotic therapy or neurosurgery. Also, if the pain warrants it, analgesic blocks may be used as palliative measures during the course of endocrine therapy.

SUMMARY

Pain is the complaint which most frequently prompts patients to seek medical aid. In most instances, it is a symptom of a medical or surgical disorder which can be cured by operation or by the use of certain drugs. Unfortunately, in some cases, the cause of the pain is not known or, if it is known, it cannot be eradicated, and other methods must be employed to treat the pain itself. The methods which are presently available for this purpose have been presented.

Although analgesic agents, particularly the narcotics, are the most commonly employed form of therapy, they must be used with discretion because they produce certain undesirable side effects. It is best to employ this group of drugs in patients in whom other methods have failed or are not feasible.

For patients with severe intractable pain who are still in fairly good health, prolonged relief should be provided by using neurosurgical operations. These include peripheral neurotomy, rhizotomy, sympathectomy, chordotomy, and prefrontal lobotomy. Each of these techniques has

specific indications and should be selected with care in order to provide optimum results.

In patients in whom interruption of pain pathways is indicated and who are in poor physical condition, nerve block should be considered. This is an effective method of physiologic sectioning of pain pathways and, when properly applied, offers certain advantages not to be had with other methods. Such blocks may be used as diagnostic, prognostic, prophylactic, and/or therapeutic measures. Since almost any nerve in the body can be interrupted, the procedure that will provide optimum relief must be chosen.

In addition to the foregoing methods, a number of other procedures may be used as adjuncts. These include physical therapy, roentgen therapy, and the use of endocrine and chemotherapeutic agents. All patients with very severe, chronic pain require psychologic and physiologic support. In some patients, the pain is related to personality factors and requires psychiatric treatment.

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Book Reviews on Pain

THE RECOVERY ROOM: A SYMPOSIUM, by JOHN ADRIANI, professor of surgery, School of Medicine, Tulane University; clinical professor of surgery and pharmacology, School of Medicine, Louisiana State University; and director, Department of Anesthesiology, Charity Hospital of Louisiana, New Orleans; and JOHN B. PARMLEY, M.D., instructor in surgery, School of Medicine, Tulane University; and visiting anesthesiologist, Tulane Unit, Charity Hospital, New Orleans, 1958. Springfield, Illinois: Charles C Thomas, 123 pages. \$4.25.

The authors have attempted with the help of a considerable number of others to answer the many questions that come up concerning a recovery room. Many typical questions with authoritative answers are presented, and the authority for each answer is given. The volume

covers practically all phases of operation of a recovery room, including its operation when it is used for care of a patient for a longer period, say two or three hours.

The book is printed on good paper, is easily read, is indexed, and will be of interest to those who are concerned with the operation of a recovery room.

JOHN S. LUNDY, M.D.

CIBA FOUNDATION SYMPOSIUM ON THE NEUROLOGICAL BASIS OF BEHAVIOUR, by G. E. W. WOLSTENHOLME and CECILIA M. O'CONNOR, editors for the Ciba Foundation, 1958. Boston: Little, Brown & Company, 400 pages, 109 illustrations. \$9.00.

This symposium records the opinions of the principal leaders in this type of work from various parts of the

world. Gross and microscopic areas in the nervous system are considered both clinically and experimentally. The subject has been covered thoroughly from practically all angles. The book contains a number of illustrations and is indexed, printed on good paper, and easily read.

JOHN S. LUNDY, M.D.

CLINICAL RADIOLOGY OF ACUTE ABDOMINAL DISORDERS, by BERNARD S. EPSTEIN, M.D., chief, Department of Radiology, The Long Island Jewish Hospital, New Hyde Park, New York; associate clinical professor of radiology, Albert Einstein College of Medicine, Yeshiva University, New York City, 1958. Philadelphia: Lea & Febiger, 352 pages, 406 illustrations on 224 figures, \$15.00.

The subject of clinical radiology in acute abdominal disorders is presented on a rather broad scale in this book. The volume is generously illustrated and is

printed on especially good paper. It is indexed by author and subject and should be a useful volume for those who are interested in this field.

JOHN S. LUNDY, M.D.

MYASTHENIA GRAVIS, by KERMIT E. OSSERMAN, M.D., F.A.C.P., physician-in-charge, Myasthenia Gravis Clinic, Mount Sinai Hospital, New York, 1958. New York and London: Grune & Stratton, 286 pages, \$10.00.

This book brings the subject of myasthenia gravis up-to-date in the light of new drugs and technics of management that have been provided in the last five years. It probably is the most detailed treatise on the subject available, and it can be read with benefit by all who are concerned in any way with the problem of this disease.

JOHN S. LUNDY, M.D.

Current Literature on Pain

A NEW NON-AQUEOUS METHOD OF ASSAY FOR THE BARBITURIC ACIDS AND SOME COMMERCIAL PRODUCTS, by L. G. CHATTEN, J. Pharm. & Pharmacol. 8:504-509 (July) 1956.

"A new non-aqueous technique has been devised for the barbituric acids, which is rapid, accurate, and can be performed visually. The procedure has been successfully applied to commercial samples of phenobarbitone tablets as well as those of phenobarbitone and aminophylline. . . . The use of potassium hydroxide in thanol as a titrant in non-aqueous titrimetry has been extended to the barbiturates.

From JOHN S. LUNDY and FLORENCE A. MCQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 36. Copyright by JOHN S. LUNDY.

THE USE OF VASOPRESSORS IN SPINAL ANESTHESIA, by H. F. CHASE, *Anesth. & Analg.* 35:395-398, 1956.

"It is axiomatic that spinal anesthesia inactivates the sympathetic vasomotor fibers below the point of block as well as the motor and sensory fibers. In fact, the sympathetic fibers, being small, are presumed to be particularly vulnerable to the local anesthetic agent. The corollary of this is that the higher the level of spinal anesthesia, the greater is the vascular field that is sympathetically denervated by it and, consequently, the more widespread and profound is the vasodilatation produced.

"The desirability of pharmacologically supporting the arterial pressure, except in those specific instances where hypotension is important to the success of the operation, has long been established. Physiologic compensation by constriction of blood vessels in the trunk and upper extremities occurs in most instances of spinal anesthesia. It is our impression that this physiologic compensation is more effective and better regulated for the patient than a pharmacologic one. Therefore, doses of vasopressors should be gauged to support rather than to replace the natural compensatory forces. . . .

"A vasopressor of the arterenol (Levophed), Neo-Synephrine, methoxamine (Vasoxyl) groups would be theoretically desirable in the hypertensive patient. Pref-

erence would be given to methoxamine because of its greater duration of action, a duration similar to that of ephedrine. . . . Every effort must be made to correct blood volume deficiencies before subjecting any patient to anesthesia. Accurate observation of the patient's vasomotor response to premedication will be an additional guide to his need of vasopressor support."

From JOHN S. LUNDY and FLORENCE A. MCQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 36. Copyright by JOHN S. LUNDY.

ANÆSTHETIC ASPECT OF THYMECTOMY FOR MYASTHENIA GRAVIS, by J. CHANG, J. H. HARRLAND, and H. B. GRAVES, *Canad. Anæsthetists' Soc. J.* 4:13-20, 1957.

"Since 1936 when Blalock performed the first successful thymectomy for myasthenia gravis, there has been much dispute about the value of this procedure as a therapeutic measure. . . . Drugs are one method of treatment. The first group is that of the anticholinesterases: (a) physostigmine; (b) neostigmine; (c) pyridostigmin (Mestinon); and (d) Mysuran (WIN 8077). Until recently, neostigmine has been the drug of choice in the treatment of myasthenia gravis. . . . Both pyridostigmin and 'Mysuran' produce similar clinical results with less side reaction and longer duration of action. . . . The second group is that of the adjuvant drugs: (a) atropine; (b) ephedrine, and amphetamine. Other methods of treatment are as follows: (1) irradiation of the thymus; (2) surgical removal of the thymus; or (3) combination of the above. . . .

"Ideally, surgery should be performed during a remission, as patients with severe cases are poor surgical risks. The nutritional state of the patient should be improved, since poor nutrition may be present as the result of weakness of the muscles of swallowing. Although Keynes is very emphatic that these patients should not be given a preoperative enema, as it may result in collapse, we have found no adverse effects. Opiates are not directly harmful but should be prescribed in minimal doses before operation, as anything diminishing the ability to cough should be avoided. Moreover, large doses

may depress the respiration sufficiently to cause anoxia. Belladonna drugs are essential, since the anticholinesterases stimulate excess secretion. Anticholinesterase drugs are required before operation in doses equal to or larger than regular amounts (e.g., neostigmine 1 to 2.5 mg. parenterally) . . .

"Endotracheal anaesthesia is the method of choice for thymectomy. . . . In severe cases with muscle weakness, no relaxant will be required, but, in the milder cases, relaxants may facilitate intubation and control of respiration. Any relaxant drugs that are used should be given judiciously and with care. Curare and other competitive blockers are contraindicated since they interfere with the action of acetylcholine at the end-plate, thereby increasing and prolonging the muscular weakness. Therefore, prolonged muscular relaxation may result with the use of tubocurarine. Theoretically, the myasthenic patient should be resistant to the depolarizing group of relaxants, such as decamethonium and succinylcholine, because of their depolarizing action at the end-plate. . . . Both agents have been used in our hospital without producing prolonged relaxation. . . .

"A wide choice of anæsthetic agents has been advocated for this procedure. Any gaseous or volatile anæsthetic agent would be satisfactory. Cyclopropane is probably the agent of choice, since it is easily administered, causes little irritation of the respiratory tree, and less depression of the muscles. The combination of cyclopropane and neostigmine may theoretically be incompatible because of neostigmine's stimulation of the sympathetic ganglia with resulting epinephrine discharge into the circulation. Clinically, the amount of neostigmine used preoperatively does not produce any appreciable sympathetic reaction. Ether tends to increase secretion in the respiratory tract and to depress the muscles more than cyclopropane. The combination of nitrous oxide and supplementary agents is satisfactory provided excessive amounts of the latter (Pentothal or Demerol, etc.) are not used. These non-volatile agents are metabolized slowly and will depress respiration centrally. . . .

"Respiratory infection and atelectasis are potential complications after surgery. Good respiratory movement and adequate nursing care will help to prevent them.

Excessive secretions are likely to be troublesome because of: (a) impaired ability to cough; and (b) the use of neostigmine, which produces profuse salivation and bronchorrhea. Atropine and tracheobronchial toilet will prevent accumulation of secretion. The possibility of post-operative pneumothorax from surgery must be borne in mind. Opiates should be used sparingly to allay restlessness. . . . Neostigmine or some other anticholinesterase drug must be administered regularly postoperatively to maintain good muscular tone and adequate respiration. . . . The immediate postoperative period is the most serious stage of the anæsthetic management and requires strict vigilance."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, pages 34-35. Copyright by JOHN S. LUNDY.

ALTERATION OF PENTOTHAL-S35 DISTRIBUTION IN MICE BY SINGLE DOSES OF METHYL-ETHYL GLUTARIMIDE (NP-13), by L. B. ACHOR, E. M. K. GEILING, and N. S. DOMEK: *Anesth. & Analg.* 35: 534-537, 1956.

"Recently, reports have appeared in the literature concerning the use of B, B-methyl-ethyl glutarimide (NP-13) in the treatment of barbituric intoxications On the basis of this information, experiments were carried out to test the ability of this compound to exert significant changes in the distribution of Pentothal-S35 in tissues and organs of mice

"The results of these preliminary experiments indicate that in addition to the promotion of a more rapid arousal of Pentothal-treated animals, NP-13 alters to a significant degree the amounts of radioactivity found in various tissues. The mechanism by which this compound exerts these effects is not known. These observations are useful in that no barbiturate antagonist has been hitherto reported to alter distribution and excretion in a manner similar to NP-13. It is hoped that these studies can serve as a basis for further consideration of the mechanisms involved in the antagonism of the effects of barbituric acid derivatives."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1957, vol. 45, page 2. Copyright by JOHN S. LUNDY.

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*L. O. Randall and J. Selitto, *J. Am. Pharm. Assn. (Sc. Ed.)*, 47:313, 1958.

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BOOK REVIEWS

(Continued from page 32)

ter by Rossi on diagnostic use of enzymes is outdated. With the exception of several references on transaminase, all literature cited was published in 1954 or earlier. Coverage and discussion of material cited is, however, aptly thorough and critical. The chapter by Sullivan on chemistry of enzymes used clinically gives straightforward coverage, such as might be found in various biochemistry texts or elementary texts on enzymes. More valuable portions of the chapters by Beiler on biochemistry of enzymes used clinically are the discussions of trypsin and chymotrypsin toxicity and effects on clotting. Literature coverage terminates with 1955 references.

The chapters by Martin are an unusual combination of truth with conjecture and overstatement. The style is florid and, in some parts, intellectually unacceptable to the reviewer. For example, I do not find meaningful the statement "Where once, the antigen, the enzyme, the gene, the virus, and the peptide hormone all stood as distinct entities, distinct in all aspects, now modern biology classifies all these as biocatalysts with a relative specificity, a relative directional modifying power, a relative target effect." The later development of such a vague overstatement is definitely unacceptable. Thus, the author states "As noted earlier, the classification of enzyme, antigen, virus, gene, protein, hormone, etc., as manifestations of the biocatalytic power of a protein moiety destroys the general concept of specificity."

The chapters are also somewhat rambling and lack organization. For example, the structural formula for adenylic acid is given twice only 11 pages apart. Reasoning in some instances is questionable. In attempting to establish that enzyme therapy "must be viewed in terms of long range and not immediate prompt effect," an approximate calculation is made that the upper possible practical dose of ribonuclease might require twenty years to destroy the ribonucleic acid of 0.1 per cent of the human body cells. However, 6.06×10^{23} (Avogadro's number) is largely overlooked, and the dose used as a basis for calculation is only 0.014 μ g. On the same basis, an 0.1 gm. dose of enzyme would require only about one minute to achieve the stated effect. In fairness, it should be stated that some suggestions and speculations do appear to have more validity.

Thus, the reviewer would agree that the recent findings that catalytic activity of certain hydrolytic enzymes can be retained in small fragments of the parent molecule do hold some promise for future investigations.

P. D. BOYER, Ph.D.

•
The Cerebrospinal Fluid: Production, Circulation, and Absorption, by G. E. W. WOLSTENHOLME and C. M. O'CONNOR, 1958. Boston: Little, Brown & Co., 333 pages. \$9.00

This small book presents a good review of our present knowledge concerning the cerebrospinal fluid. It consists of a series of well selected papers on this subject presented at a symposium sponsored by the Ciba Foundation. Included in this volume are the most enlightening discussions of each of the papers by a panel of specialists invited to participate in this symposium. Although this book does contain a great deal of factual data concerning the cerebrospinal fluid, it also emphasizes the large gaps in our present knowledge concerning this subject. This small volume may prove of value to those particularly interested in this field.

A. B. BAKER, M.D.

•
Lesions of the Cervical Intervertebral Disc, by R. GLEN SPURLING, M.D., 1956. Springfield, Illinois: Charles C. Thomas. \$4.75.

In 1953, Dr. Spurling wrote his monograph on Lesions of the Lumbar Intervertebral Disc, which has since become a classic in its field. This presentation of the cervical intervertebral disc and its abnormalities is likewise a masterpiece in conciseness, presentation, and in the wealth of material which it contains. The treatise is excellent, and few orthopedic surgeons or neurosurgeons of experience would find anything in its content with which they would quarrel.

Every phase of the problem is discussed in considerable detail. The author's indication for surgical treatment appears to be based on sound clinical data. Perhaps some orthopedic surgeons would disagree with the expressed belief that after forty-eight hours of conservative treatment, if the patient still has radicular pain and positive neurologic signs of root compression, traction therapy is considered to have failed and surgical treatment is advised. However, the author's operative results appear to be on the whole, ex-

cellent, with complete recovery in 73.7 per cent of patients as compared to 48 per cent of excellent recoveries under conservative management. Results were rated poor in only 10 per cent of his patients treated surgically, whereas 29 per cent of the conservatively treated group were so rated. It is conjectural, but possible, that a more prolonged period of conservative therapy might lead to a higher incidence of recovery from the cervical disc syndrome. The use of local infiltration into trigger points of tenderness and spastic muscle is not mentioned under conservative management.

On the whole, this volume is extremely valuable to anyone treating patients with pain in the neck and radiculitis into the arms and shoulders. When combined with a more conservative approach to the problem, such as outlined in Dr. Ruth Jackson's monograph on the same subject, an excellent review of the present day concepts of the management of these difficult lesions is made available.

JOHN H. MOE, M.D.

•
Abnormal Labor, by L. A. CALKINS, M.D., 1958. Springfield, Illinois: Charles C. Thomas, 70 pages. \$2.75.

This is another publication of the Thomas American Lecture Series and another characteristically careful, thoughtful monograph by Dr. Calkins. As a sequel to his previous publication entitled "Normal Labor," "Abnormal Labor" is a short, concise reference to various problems encountered in each stage of parturition.

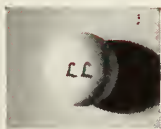

Standard management and therapy recommended for various complications are presented, based on the experiences of the author and others. However, some techniques mentioned, such as the use of abdominal binders in uterine dysfunction, are not commonly used in most clinics today.

An appendix is present which gives valuable information in predicting the duration of the second stage of labor. Measurement of the duration of the second stage of labor by the number of uterine contractions rather than by minutes is a new and useful concept.

The monograph certainly fulfills its objective as a useful, readable reference guide eliminating details for inclusion in a more elaborate text.

ERNEST W. LOWE, M.D.

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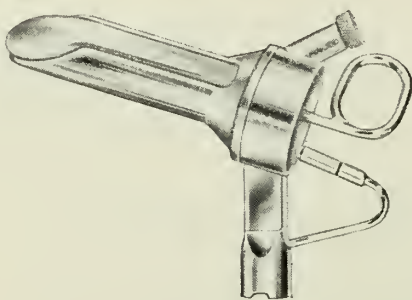
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News Briefs . . .

North Dakota

DEDICATION OF THE McCANNELL BUILDING on the campus of the University of North Dakota concluded the annual meeting of the North Dakota chapter of the American Academy of General Practice held November 21 and 22 at the University. Dr. Frank Krusen, nationally-known leader in physical medicine and rehabilitation, was guest speaker at the dedication. Named for Dr. Archie D. McCannell, a Minot physician for many years, the \$350,000 building has been open since January 1958 and houses both the Rehabilitation Unit and the Student Health Service.

.

THE NEW SOUTHWEST FARGO MEDICAL CENTER opened recently in a \$40,000 building. The Center is operated by Dr. R. E. Kulland and Dr. B. G. Smith, both of whom are general practitioners. Dr. Kulland has practiced in Southwest Fargo since 1948. He was joined by Dr. Smith in 1956, and the two formed a partnership in January 1958. The one-story structure of steel and pumice block is 42 by 66 ft. In addition to the lobby and reception room, the building houses an x-ray room, laboratory, therapy treatment room, emergency room, consultation rooms for each doctor, a library, and a private lounge.

.

DR. P. J. WEYRENS recently received special recognition for his thirty years of service to the Hebron community at a combined meeting of the Lions Clubs of Hebron, Glen Ullin, and New Salem, which were also observing their thirtieth anniversary. Dr. Weyrens was presented with an engraved plaque inscribed with words of appreciation for his service to the residents of Hebron.

.

DR. EDWIN O. HIEB, a member of the DePuy-Sorkness Clinic in Jamestown, has been notified by the American Board of Internal Medicine that he has been certified as a specialist in internal medicine. Except for two years spent in military service and two years as a resident in internal medicine at the University of Minnesota Graduate School, Dr. Hieb has been associated with the DePuy-Sorkness Clinic since 1950.

.

DR. HARRIS D. HANSON, a specialist in orthopedic surgery, has joined the Quain and Ramstad Clinic in Bismarck. Dr. Hanson received his medical degree from Loyola University. His internship at Milwaukee County Hospital was followed by a residency in general surgery at Veterans Hospital in Dayton, Ohio. He then served for fifteen months in the United States Army. He served his residency in orthopedic surgery at the Indianapolis General Hospital and continued his training at James Whitcomb Riley Children's Hospital in Indianapolis until 1958. Before joining the Quain and Ramstad Clinic, Dr. Hanson was on the staff of St. Vincent's Hospital in Indianapolis.

.

DR. R. WARREN PIERSON has joined the Quain and Ramstad Clinic in the Department of Surgery. A graduate of the University of Illinois Medical School, Dr. Pierson in-

(Continued on page 32A)

Thank you, doctor"



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glucosamine-potentiated tetracycline with nystatin
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NEWS BRIEFS

(Continued from page 28A)

turned at the Los Angeles County General Hospital and served his residency in surgery at the Bismarck Hospital. For the past two years, he has served in the United States Medical Corps.

Minnesota

THE MINNESOTA DEPARTMENT OF WELFARE has announced that the Recalcitrant Unit at the Anoka State Hospital is available for caring for irresponsible people with active tuberculosis who may endanger the health of others. Any health officer may report his knowledge of a recalcitrant person to the Board of County Commissioners or the District Court. Through the board or court, such persons may be given a fair hearing and committed to a designated tuberculosis sanatorium, including the Recalcitrant Unit. For further information about procedures, the physician should consult his local or state health department, tuberculosis sanatorium, State Department of Welfare, or the Anoka State Hospital.

A GROUP OF ST. PAUL PHYSICIANS who are attempting to establish a four-year medical college in St. Paul have officially decided to call their group the Northern Association for Medical Education (NAME). According to preliminary plans, the school would have an enrollment of about 280 students and a graduating class of around 69 physicians. The college would be built strictly with voluntary funds and membership in NAME itself would be strictly on a voluntary basis.

THE NEW HOSPITAL in Tyler has been named the Dr. A. L. Vadheim Memorial Hospital after the man who has given his undivided and untiring service to the community for over forty-eight years. About 2,000 persons attended the open house held at the hospital early in November. Visitors were taken in groups of 10 on guided tours through the new 35-bed building.

DR. THOMAS B. MAGATH, head of the Section of Clinical Pathology of the Mayo Clinic from 1946 to 1958 and professor of pathology in the Mayo Foundation, received the Ward Burdick Award of the American Society of Clinical Pathologists at a dinner meeting of the group held in Chicago in November. The award is described as "a gold medal which shall be presented to that fellow who, in the opinion of the Research Committee, has presented the most meritorious contributions to the science of clinical pathology."

DR. OWEN H. WANGENSTEEN, professor and chairman of the Department of Surgery at the University of Minnesota, received a scroll from the Radiological Society of North America commemorating his Carman Lecture which he presented at the organization's annual meeting in Chicago. The Carman Lecture is the scientific highlight of the Radiological Society's annual convention. Dr. Wangenstein spoke on "Carcinoma of the Stomach."

DR. O. T. CLAGETT, head of a section of surgery at the Mayo Clinic, has been elected president of the clinic (Continued on page 36A)

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DILAUDID hydrochloride . 1 mg. (1/64 gr.)
Glyceryl guaiacolate . . 100 mg. (1 1/2 gr.)
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Dose: 1 teaspoonful (5 cc.) repeated in three to four hours.

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Chlormycetin phosphate (tetracycline phosphate complex) equivalent to tetracycline hydrochloride	250 mg.
Albamycin (as novobiocin sodium)	125 mg.

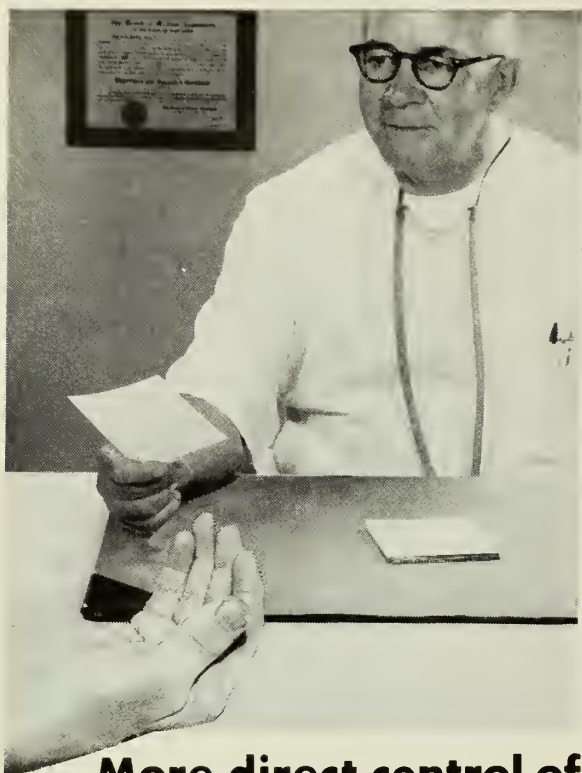
Panalba KM,†† Flavored Granules, 60 cc. bottle. When sufficient water is added to the bottle, each teaspoonful (5 cc.) contains:

Chlormycetin (tetracycline) equivalent to tetracycline hydrochloride	125 mg.
Albamycin (as novobiocin calcium)	62.5 mg.
Calcium metaphosphate	100 mg.

Dosage:
Panalba Capsules. Usual adult dosage is 1 or 2 capsules 3 or 4 times a day.

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NEWS BRIEFS

(Continued from page 32A)

staff to succeed retiring president, Dr. G. J. Thompson. Other officers elected were: Dr. H. W. Schmidt, vice president; Dr. C. A. Owen, Jr., secretary; and Dr. W. G. Sauer and Dr. G. W. Daugherty, councilors. Re-election of Dr. J. T. Priestley, present chairman of the Board of Governors and head of a section of surgery, and Dr. C. F. Code, chairman of the section of physiology, to the board was confirmed.

• • • •

DR. ADOLPH G. LIEDLOFF, retired Mankato physician and health officer, was the recipient of an honorary membership in the Minnesota Public Health Conference at the organization's annual Albert J. Chesley, M.D. memorial banquet. Dr. Liedloff retired in 1956 after nearly fifty years of service in public health.

• • • •

DR. JOHN D. KRAFCHUK has returned to Minnesota and opened an office in the Medical Arts Building in Minneapolis. He was called back into military duty in 1954 and became chief of dermatology at the United States Naval Hospital at Mare Island, California. For the past three years, Dr. Krafchuk has been assistant professor of medicine (dermatology) at Tulane University School of Medicine and director of the skin histopathology laboratory at that institution. He was elected president of the Louisiana Dermatological Society last year. A year ago, Dr. Krafchuk presented three papers on cutaneous wound healing and on fungus infections at the International Congress of Dermatology in Stockholm.

Deaths . . .

DR. LEE MCKENDREE EATON, 53, chairman of the sections of neurology at the Mayo Clinic and professor of neurology in the Mayo Foundation, died November 18. Dr. Eaton was a world-wide authority on neuromuscular disorders and was to have given the presidential address at the meeting of the Association for Research in Nervous and Mental Diseases in December. He was a fellow of the American Academy of Neurology, a member of the advisory board of the Myasthenia Gravis Association and the American Neurological Association, and a member of numerous other organizations.

• • • •

DR. WILLIAM H. EDYVEAN, 51, of Deadwood, South Dakota, died of a heart attack November 13. Dr. Edyvean attended the University of Austria at Innsbruck in 1951. In 1952, he entered the University of Switzerland and was graduated from medical school in 1955. During World War II, Dr. Edyvean served as chief petty officer in the United States Navy. He had practiced in Deadwood for about two years.

• • • •

DR. O. R. WRIGHT, 90, of Huron, South Dakota, died November 8. He began practice in Huron in 1902 and, in 1952, received a 50-year pin from the South Dakota Medical Association. During World War I, Dr. Wright was placed in command of the French Second Fracture Base Hospital. The French government honored him with a state dinner and conferred upon him the title of Officer of the Academy of the Beaux Arts.

COMING in *March* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Appearing in the fracture series is an article by Ralph K. Ghormley, M.D., of the Mayo Clinic, entitled "Forty Years of Orthopedic Surgery." The paper tells of the developments in orthopedic surgery since World War I, when Dr. Ghormley served with the American Expeditionary Forces in France and first became interested in the care of orthopedic patients. Attention is drawn to the improvements in orthopedic surgical methods that have taken place over the years and to the continual effort being made to improve the quality of programs designed to train orthopedic surgeons. As a result of the rapid growth of orthopedic surgery, conflicts with other specialties have arisen, which, as Dr. Ghormley points out, probably indicates the dynamic expansion in all fields of medicine today.

- In the communicable disease series, Chris M. Christu, M.D., of Fargo, North Dakota, writes on "Influenza." The etiology and epidemiology of this acute, infectious, epidemic disease are discussed, and its clinical picture is described. Treatment is primarily supportive, but vaccination has proved effective in reducing the incidence and severity of influenza.

- The paper "Posterior Mediastinal Goiter" by Jack M. Moseley, M.D., of Santa Barbara, California, is primarily devoted to the treatment of this type of goiter, although other types are discussed. A posterolateral thoracotomy incision is the procedure recommended for the removal of a posterior mediastinal goiter, since the cervical approach might result in hemorrhage and damage to the laryngeal nerve. This technic is described in the case report of a woman on whom this operation was performed.

- "Adenomas of the Colon and Rectum" by E. R. Wasemiller, M.D., of Wahpeton, North Dakota, includes a review of the basic concepts that have been developed in past decades concerning the etiology, incidence, pathogenesis, diagnosis, and treatment of these lesions. Colonic and rectal adenomas are premalignant and should be removed. Several methods may be used for this purpose, and the choice is determined by the type, size, and location of the adenoma. These procedures are outlined accordingly.

Meetings and Announcements

UNIVERSITY OF MINNESOTA

MEDICAL CONTINUATION COURSES

February 23-25—Cardiovascular Diseases for General Physicians

March 2-4—Pediatrics for General Physicians

March 14—Trauma for General Physicians

March 16-18—Internal Medicine for Internists

March 30-April 3—Basic Concepts of Water and Electrolyte Balance for General Physicians

April 2-4—Emergency Surgery for General Physicians

April 6-8—Radiology for General Physicians

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

CLINICAL REVIEWS

Staff members of the Mayo Clinic and Mayo Foundation for Medical Education and Research will again present a program of lectures and discussions on problems of current interest in general medicine and surgery on April 13, 14, and 15. Members of the American Academy of General Practice are entitled to twenty-one hours of Category I credit. There are no fees, but accommodations are limited. Those wishing to attend should communicate with the Clinical Reviews Committee, Mayo Clinic.

ALLERGISTS' COURSE

The American College of Allergists Graduate Instructional Course and Annual Congress will be held March 15 to 20 at the Mark Hopkins Hotel, San Francisco. For details, write John D. Gillaspie, M.D., Treasurer, 2049 Broadway, Boulder, Colorado.

OBSTETRIC AND GYNECOLOGIC AWARDS

The Division of Obstetrics and Gynecology of the International College of Surgeons will offer two awards, the first \$500 and the second \$300, for the best paper on a phase of obstetrics and gynecology. Manuscripts of not more than 5,000 words must be submitted on or before June 1, 1959, to Dr. Harvey A. Gollin, Secretary of the Prize Committee, 55 E. Washington St., Chicago 2. Write Dr. Gollin for information on contest rules.

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Keratoses and Precancerous Lesions of the Skin

ROBERT W. GOLTZ, M.D.

Minneapolis, Minnesota

CANCER OF THE SKIN and mucous membranes represents the most common form of cancer. Fortunately, many skin cancers are of low malignancy, and their exposed location makes them amenable to early diagnosis and effective treatment, so their mortality rate is comparatively low. Still, in our aging population, cutaneous cancers and their precursors are becoming an increasingly important problem with which every physician who deals with patients past middle life is faced.

SEBORRHEIC KERATOSES

Seborrheic keratoses are the most common of the keratoses. Most elderly people have one or more, and these "liver spots" or "warts" are rightly regarded by lay people as a sign of aging.

Properly, seborrheic keratoses should not be included in a discussion of precancerous skin lesions, because they rarely undergo malignant degeneration. They are probably little more apt to become malignant than the nearby, apparently normal skin. Uncomplicated seborrheic keratoses need, therefore, be removed only for cosmetic reasons.

ROBERT W. GOLTZ is clinical assistant professor of dermatology at the University of Minnesota Medical School.

Paper presented at the continuation course in dermatology for general physicians at the University of Minnesota, October 23, 1958.

While seborrheic keratoses are found in many people past middle life, some individuals develop great numbers of them—sometimes hundreds of lesions. They may occur anywhere on the body, but they are particularly apt to appear on the so-called "seborrheic" areas of the face, scalp, neck, back, and presternal skin, which are regions richly supplied with sebaceous glands and sites of predilection for acne and seborrheic dermatitis (figure 1). Why these keratoses are particularly prone to develop in these areas, we do not know. Their nature and course suggest that they are delayed epithelial birthmarks. If the concept of nevoid lesions appearing late in life appears inconsistent, consider the parallel of von Recklinghausen's disease in which neurofibromas continue to appear throughout life. Furthermore, both clinically and histologically, seborrheic keratoses are indistinguishable from some epithelial birthmarks found in newborns and young children.

Seborrheic keratoses appear as warty but soft and greasy elevations on the surface of the skin. They are not indurated and appear as if stuck on the surface of the skin. They vary in size from minute pinhead-sized papules to giant lesions an inch or more in diameter. They are usually some shade of brown but may be no darker than the neighboring skin. Keratoses of markedly different size and color may lie side by side, perhaps representing lesions of different ages.

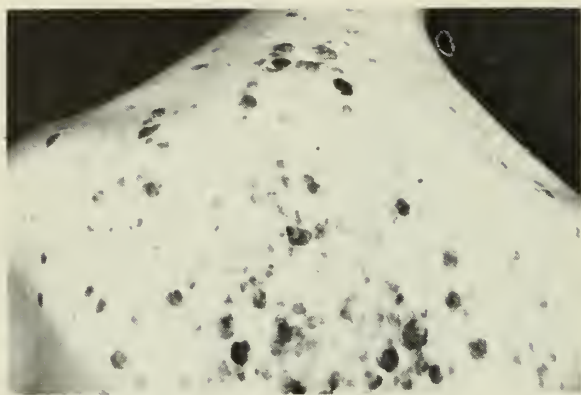


Fig. 1. Multiple seborrheic keratoses on the back.



Fig. 2. Cutaneous horn on the rim of the ear.

Seborrheic keratoses are usually not difficult to recognize clinically. Their appearance is sometimes simulated by common warts, moles and blue nevi, and pigmented basal-cell epitheliomas. As stated before, they sometimes cannot be distinguished, except by history, from other epithelial nevi.

Treatment. Atypical lesions should be removed for biopsy. Since they are situated on the surface of the skin, characteristic lesions can be "wiped off" with a cauterizer under procaine anesthesia, leaving little scar. When the number of lesions is very large, they can be quickly removed by dermabrasion without anesthesia.

ACTINIC KERATOSES (SENILE AND ROENTGEN)

In this discussion, senile and roentgen keratoses will be grouped together, since they both occur as a result of damage to the skin by excessive exposure to radiant energy and both are premalignant.

Senile keratoses, while not as common as seborrheic keratoses, present a more important problem because these lesions are definitely preneoplastic. Unfortunately, they are usually not as conspicuous as seborrheic keratoses and do not bring the patient to the doctor as quickly. Senile keratoses are definitely associated with actinic radiation and are usually confined to areas of the skin exposed to the sun. The combination of senile keratoses, epitheliomas, and other signs of aging is characteristic of "farmer's and sailor's" skin, which is also seen increasingly in other classes of society among those who are addicted to excessive sunbathing or regular exposure to ultraviolet lamps. There is definite correlation with skin and hair coloration, sandy-complexioned people of North European extraction being particularly susceptible to senile keratoses, while they are almost unknown in Negroes.

Clinically, senile keratoses are more easily felt than seen. They consist of hyperkeratotic spots of limited size, the keratinous scales being firmly adherent to the skin. Their color is that of the surrounding skin or pale gray or brown. In occasional instances, hyperkeratosis is extreme, giving rise to cutaneous horns (figure 2). As a result of slight trauma, they may bleed a little, but recurrent episodes of bleeding and any induration of the base should be regarded as indicative of malignant degeneration.

In the rare hereditary condition called xeroderma pigmentosum, many "senile" keratoses develop on exposed parts of the skin of children at an early age after very little exposure to sunlight. In these unfortunate families, countless keratoses and skin cancers develop in the children, who usually succumb to metastatic cancer before reaching adulthood.

Keratoses and skin cancers, as well as the other signs of chronic radiodermatitis, form on skin which has been damaged by excessive roentgen or radium irradiation. These lesions may occur on any area of the body, but they are most commonly seen on the face and neck of individuals who, in the early days of x-ray therapy, were improperly treated for acne; on the lower face and neck of women who were irradiated for hypertrichosis by "trichologists"; on the hands of physicians and dentists (figure 3); and on the chests of patients with longstanding pulmonary disease who have been subjected to repeated fluoroscopy and roentgenography. Whether or not individuals with fair skins are more susceptible to this type of injury is not known. There may be an additive effect from sunlight exposure of skin previously damaged by ionizing radiation.

Treatment. Because of the danger of malignant degeneration, senile keratoses and those occurring after ionizing radiation should be re-



Fig. 3. Chronic radiation damage of the hand of a physician. Note the multiple keratoses, early carcinomas, and change in the nails.



Fig. 4. Multiple arsenic keratoses. The more prominent lesions may be in the process of undergoing malignant degeneration.

moved as soon as possible. This is easily accomplished by cauterization. Though they can be removed by x-radiation, there seems to be little justification for this potentially dangerous form of treatment. Whenever malignant degeneration is suspected, excision for biopsy should be done.

ARSENIC KERATOSES

In former years, inorganic arsenic salts, usually in the form of Fowler's solution, were given for anemia, psoriasis, asthma and as a general tonic. Occasionally today, an individual past middle life is seen who, years after taking these drops, is developing a reaction to them in the form of multiple punctate keratoses on the palms and soles (figure 4) and superficial basal cell epitheliomas and plaques of Bowen's disease elsewhere on the skin. The palmar and plantar keratoses may give rise to squamous-cell carcinomas.

Several things are remarkable about this reaction:

1. The fact that a simple chemical element is capable of inducing cancer.
2. The fact that only the inorganic form of this element can do so, while organic salts of arsenic, such as arsphenamine, produce entirely different reactions.
3. The long lag period between the ingestion of the metal and the appearance of keratoses and cancers.
4. The fact that once the reaction pattern is established, it cannot be reversed by chelation with BAL.
5. The fact that both basal- and squamous-cell cancers appear simultaneously in the same individual.

Treatment. Once arsenic keratoses begin to

appear, there is no known way of preventing the development of more of them. As noted previously, chelation with BAL is of no value. Lesions on the glabrous skin should be removed or destroyed by cautery. Punctate keratoses on the palms and soles are usually so numerous that they cannot be successfully removed. In these cases, the best course is close observation, with appropriate treatment should malignancy supervene. The patient must be fully informed of his peril, so that his complete cooperation is obtained.

BOWEN'S DISEASE

This precancerous condition of the skin is important because, though not uncommon, it is not as well known as the others and, hence, is frequently not diagnosed. Histologically, it consists of the abnormal development of cells in the epidermis, comparable to carcinoma in situ of the cervix uteri. The abnormal cells are confined within the epidermis for long periods of time, sometimes several decades. Eventually they break through the basal layer, producing invasive carcinomas, either basal-cell or squamous-cell in type, but usually the latter, hence capable of metastasis.

Clinically, Bowen's disease consists of single or multiple scaly plaques which slowly enlarge over a period of years (figure 5). They closely resemble plaques of psoriasis and are frequently misdiagnosed as such, particularly in patients with psoriasis elsewhere on the body who, at times past, have received Fowler's solution. These lesions may be distinguished from psoriatic plaques by their atypical appearance and by the fact that they are persistent, slowly enlarging over a period of years, a most unusual course for psoriatic plaques, which usually come

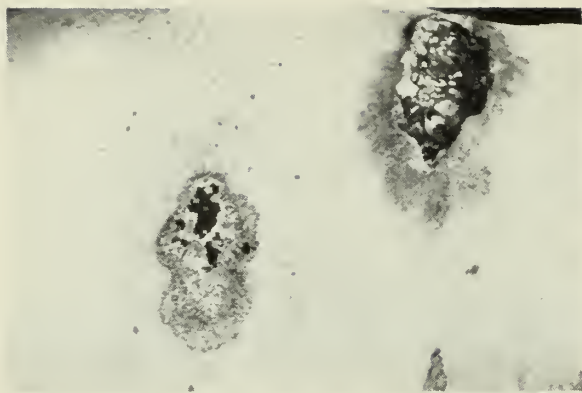


Fig. 5. Multiple plaques of Bowen's disease on the back. Lesion on the left is more characteristic; that on the upper right has become invasive carcinoma.



Fig. 6. Bowen's disease (erythroplasia) in the coronal sulcus. The plaque is red and moist when located in this region.

and go, albeit slowly in some instances. Eventually, if left untreated, lesions of Bowen's disease become thickened and ulcerated, an almost sure sign of malignant degeneration.

Bowen's disease is indistinguishable clinically from plaques of superficial multicentric basal-cell epitheliomas. Even the most expert must perform a histologic examination to differentiate between the two entities. Sometimes, particularly in people who have ingested inorganic arsenic, Bowen's disease and superficial basal-cell epitheliomas may exist concurrently.

Bowen's disease, or carcinoma in situ, may also arise on the mucous membranes. In the mouth, it occurs as reddened plaques having a somewhat granular surface. A special form of Bowen's disease, known as erythroplasia of Queyrat, occurs on the transitional epithelium of the penis (figure 6). Especially in uncircumcised individuals, these lesions have a somewhat different appearance than Bowen's disease on glabrous skin. The plaques are redder, less scaly, and may have a moist surface. Bowen's disease on the mucous membranes probably becomes invasive carcinoma in a much shorter time than that on skin.

Treatment. Like all precancerous skin lesions, Bowen's disease foci should be removed by excision or destroyed by cautery. They are not particularly radiosensitive.

KERATOACANTHOMA

In recent years, a new entity has been clearly set apart from squamous-cell carcinoma of the skin. This tumor has been variously labeled molluscum sebaceum or self-healing epithelioma but is probably best called keratoacanthoma. The lesions consist of rapidly growing keratotic

growths, which, in a few weeks, reach the size of marbles or walnuts. They occur almost invariably on the face, neck, hands, or forearms and resemble rapidly growing squamous-cell carcinomas. They are characterized, however, by central umbilication, the central depression being filled by an adherent horny plug. If left alone, these lesions disappear spontaneously within a few more weeks, leaving little or no scar. Their cause is completely unknown.

Histologically as well as clinically, keratoacanthomas may be difficult to distinguish from squamous-cell carcinomas. They are composed of actively proliferating prickle cells. Their rapid rate of growth is explained by tremendous mitotic activity. The cellular elements are well formed, however, and they have been compared to "grade one-half" squamous-cell carcinomas. They do not break through the basal layer barrier and remain well circumscribed. The central keratotic plug is well visualized histologically.

Treatment. If the attending physician has faith in his diagnosis, these lesions can be left untreated. Radical surgery is certainly not indicated. Local removal is justified.

SUMMARY AND CONCLUSIONS

The appearance, course, and management of a number of cutaneous keratoses and precancerous conditions have been reviewed. These included seborrheic and senile keratoses, roentgen and arsenic keratoses, Bowen's disease, and keratoacanthomas. These lesions can be diagnosed easily by their clinical and histologic features. The premalignant lesions should be removed prophylactically. This is best accomplished by local excision or destructive means.

Pertussis

JAMES V. MILES, JR., M.D.

Jamestown, North Dakota

THE MORBIDITY AND MORTALITY RATES from pertussis have steadily decreased in the United States. Statistics have repeatedly shown this trend.¹⁻³ Why then should time and effort be spent on a disease that is no longer a threat? Mass immunization programs have been devised and practiced in the country for the past thirty years. Antibiotics have done much to control the complications. So, it seems that a review of pertussis could accomplish nothing in this modern era of medicine. Yet, we still read in the literature that pertussis continues to occupy an important position with respect to mortality and morbidity in the first few years of life. Pertussis causes more deaths in the first year of life than measles, scarlet fever, diphtheria, and poliomyelitis together.⁴ Atypical pertussis can and does occur in children who have been immunized. A series of 100 cases of culturally proved pertussis was collected in one year in children who nearly all had received the complete immunization program.⁵

Blanchard and Ford⁶ state that approximately 75 per cent of infants are immune to pertussis when they receive the initial series of pertussis vaccine starting at 4 months of age. If 25 per cent of the children who are immunized are not protected against pertussis, the total number of unprotected children in the United States must be staggering when one considers the thousands of children who have never been given the benefits of active immunization either because of indifference on the part of the parents, lack of confidence in medical advice, or the lack of adequate facilities in isolated areas of the country. So, perhaps there is some merit in reviewing a disease which can occur in spite of immuniza-

tion programs. Perhaps time should be spent in review of a disease that continues to cause many deaths in infancy. Perhaps consideration should be given to the atypical aspects of a disease which makes diagnosis difficult.

There is no intention of reviewing the typical pertussis picture in this paper. Any standard textbook can and should be consulted with regard to this disease. Brennemann's Practice of Pediatrics⁷ contains an excellent and comprehensive review of pertussis. Nelson's Textbook of Pediatrics⁸ also gives a complete and concise review. Instead, this paper will deal primarily with the unusual aspects and the atypical picture of the disease and the factors which may contribute to the evolution of atypical pertussis.

INCIDENCE

Only a casual inspection of the figures from the National Office of Vital Statistics is required to be convinced that the case rate and mortality rate from pertussis in the United States has declined markedly in the past decades. In the United States, 62,786 cases of pertussis were reported with 467 deaths in 1955, and 156,517 cases were reported with 1,954 deaths in 1947. In Minnesota, the yearly average incidence during the ten-year period of 1915 to 1925 was 1,216 cases. The yearly death rate average was 167 cases. In contrast to these figures, during the six-year period from 1951 to 1957, the yearly average cases reported were 644, and the average death rate per year was 2.1. In North Dakota, for the ten-year period from 1924 to 1935, the number of cases averaged 773 yearly, and the average deaths per year numbered 36. For the nine-year period of 1948 to 1956, in North Dakota, the average number of cases reported yearly was 218, and the average yearly death rate during this same period was 2.1. No one questions the

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accuracy of any statistical study. These figures merely reflect the number of cases recognized and reported to the public health authorities. It must also be realized that in any reporting period, the total figures may represent only a portion of the number of cases that were seen, recognized, and reported.

The criteria for the diagnosis of the disease may have changed in the past decades. Years ago a physician could report a case of pertussis on the basis of clinical diagnosis. In the present day, the physician is reluctant to report a case of pertussis without bacteriologic proof. Certainly, an atypical case in a child who has been immunized should be proved culturally before the case is reported. Perhaps, in a large part, these figures reflect only the decline in the incidence of the typical pertussis case.

The early use of antibiotics in the treatment of upper respiratory infections and bronchitis undoubtedly has an effect on the morbidity rates of pertussis. How relatively simple it is in this antibiotic era to start a child on medication before the exact bacteriologic diagnosis is made, and there is no question that many of these children are well before the cultures have been reported if treatment has been adequate.

CLINICAL COURSE

The typical case of whooping cough in a child follows a progressive pattern that can be divided into three stages. The preparoxysmal or catarrhal stage lasts one to two weeks or even as long as three weeks. Symptoms are nonspecific and may include nonproductive cough, low-grade fever, and malaise. The paroxysmal stage is characterized by the diagnostic inspiratory whoop heard at the end of a long paroxysm of coughing. This stage lasts one to three weeks. The final stage of regression or resolution becomes apparent as the condition progresses into paroxysmal coughing, which is less severe in intensity and duration and is accompanied by a decrease in the amount of vomiting.

A variation of this typical picture, which has been only briefly described, is seen in small infants. The characteristic whoop may be replaced by choking spells. Felton⁴ reports that the paroxysmal stage progresses more rapidly in infants, particularly those in a very young age group, and may not produce the characteristic whoop at all, probably because of their small chest structure and immature respiratory apparatus. These babies do not handle their paroxysms well and become cyanotic and even apneic during the paroxysms. They vomit more often than older children and seem to be more susceptible to

changes in environmental temperature and to hot and cold feedings.

A child who has been immunized may present an atypical picture. He may have a severe productive cough, which may or may not be paroxysmal, and which often does not demonstrate the clinical diagnostic sign of whooping. The child may have been partially immunized or may have received the entire initial series with or without the booster immunizations. A specific diagnosis in this case may be impossible except by obtaining positive cultures from the nasopharynx. The typical stages of whooping cough may not be easily recognized in such a child. This type of atypical whooping cough, in which the diagnosis may be doubtful, carries with it just as much danger for the infant who is exposed.⁴

Jaffe⁵ found 100 cases of culturally proved pertussis in a period of thirteen months in children who had nearly all received a complete series of immunizations for whooping cough. An accurate record of the immunization program was available on most of these children. Pertussis was suspected when the history disclosed a bad productive cough of over one week's duration, which was becoming worse while the child remained afebrile. Additional symptoms frequently described were spells of coughing, strangling, and, in some cases, gagging, vomiting, and whooping. Only in the more severe cases was coughing actually witnessed by the observer, since these children coughed for the most part at night. Physical examination was helpful chiefly in the negative sense in that the diagnosis of pertussis was considered more likely if nothing was found on physical examination to account for the foregoing symptoms.

Felton also reminds us that the typical course of whooping cough may be changed and the inevitable sequence of events halted by giving broad-spectrum antibiotics or specific serum early in the catarrhal stage of the disease. The symptoms may disappear three to four days after the start of therapy and, in most cases, do not recur if the treatment has been adequate. In a few instances, the original signs and symptoms may reappear ten to fourteen days after therapy has been discontinued. Repeat cultures at this time are usually negative. No explanation is known for this reactivation of symptoms at this particular time interval and for the reactivation of whooping and vomiting with each new upper respiratory infection for as long as two years after the original illness. According to Felton, whooping cough caused by *Bordetella pertussis* is the only condition in which this

characteristically happens. *Bordetella pertussis* is the new name for *Hemophilus pertussis* which will appear in the seventh edition of Bergey's Manual.

Bradford⁸ mentions two proved cases of pertussis in nonimmunized persons in whom the entire duration of the cough was one week. He also mentions another instance in a previously immunized patient who coughed only four days, during which time the nasal culture was positive. The ages of these patients were not mentioned.

DIAGNOSIS

No one disputes the fact that typical severe pertussis is readily recognized during the paroxysmal stage. However, in the early stage and in atypical forms, it may be quite difficult to diagnose clinically. We recall the figures indicating the decrease in frequency with which pertussis has been diagnosed in the United States, but this may reflect only the decrease in the easily recognizable form of the disease. It has been suggested that antibiotics and prior immunizations against pertussis may affect the clinical course of the disease and the isolation of the etiologic agent from the patient. Surely, then, the diagnosis cannot be made with certainty in the atypical forms of pertussis nor in the early catarrhal stage. Let us review the laboratory aids which are said to be helpful in the diagnosis of this disease.

It has been stated that characteristic changes in the white blood cells occur during the late catarrhal and early paroxysmal stages. It is reported that a definite leukocytosis is present with a progressive increase in the relative and absolute number of lymphocytes. We are warned in the texts, however, that, on occasion, the lymphocytes may appear late or the degree may be equivocal.⁸ Jaffe, on the other hand, reports in her series of 100 cases of pertussis in previously immunized children that the white blood counts and the differentials were not characteristic of pertussis and were, therefore, of no help in the diagnosis. Felton does not even discuss the changes in the peripheral blood in her discussion of specific diagnosis of pertussis. Perhaps, then, we should not lean too heavily on this laboratory aid to confirm or rule out the possibility of whooping cough.

Cohen⁹ points out that he found an extreme low sedimentation rate of 1 mm. in one hour in his last 22 cases of uncomplicated pertussis. He feels that this makes the diagnostic confirmation of pertussis much easier, even though the first cough plate cultures may have been negative.

He states that 90 per cent of his patients were clinically classical whoopers. He found that the cases in which the sedimentation rate was over 10 usually began to show signs of pneumonia confirmed by x-ray or physical examination. It will be interesting to see if this fact can be confirmed by other investigators and whether it will hold true for the atypical case.

The specific diagnosis of pertussis, whether typical or atypical, depends upon the bacteriologic isolation of the etiologic agent. With the knowledge that specific therapy is effective only if it is used in the early stage of the disease, it becomes apparent that successful treatment depends entirely upon early and accurate diagnosis. This fact implies that treatment must be instituted before the disease can be recognized clinically. Many physicians do not have available laboratories in which to perform bacteriologic tests for the isolation of pertussis. Physicians who depend upon their state public health laboratories to process their smears and cultures do not have a method available to them for the isolation of pertussis. Bauer,¹⁰ the director of Medical Laboratories in the state of Minnesota, has said that the best diagnostic procedure for the correct diagnosis of pertussis is obtained through the isolation and identification of the organism either through the cough plate method or by streaking material collected from the nasopharynx upon appropriate media. He also states that Minnesota does not even undertake this kind of examination in its public health laboratories, because no suitable method has been devised whereby the plates can be shipped to the laboratories. Agglutination tests, complement fixation tests, and skin tests have not proved satisfactory in the diagnosis of pertussis. The physician must provide his own means of isolating the pertussis organism. He must collect the material to be cultured and immediately transfer the specimen to the appropriate culture plates. This is certainly a most unsatisfactory procedure for the busy general practitioner, and, yet, with the emergency of resistant strains of bacteria, medicine is being forced to depend more heavily on the bacteriologic aspect of infectious diseases. It would not be difficult for the physician to provide himself with the diagnostic tool that is so important in the diagnosis of pertussis.

Felton has outlined a few simple directions for the successful bacteriologic diagnosis of respiratory disease which can be carried out in any laboratory. Her excellent suggestions are reproduced in the following paragraphs. The nasopharyngeal swab method of obtaining the secretion for culture, if properly carried out, is the

method of choice. The swab should be prepared from fine nicochrome or stainless steel wire, 28 gauge, cut in 8 in. lengths. A loop is made at one end to act as a handle. The tip is dipped in collodion and carefully covered with absorbent cotton. Each swab should be carefully checked to be sure the cotton tip is secure. With a little practice, uniformly finely wound swabs can be made so that the cotton completely covers the end of the wire. The swab must not be too cumbersome to be passed through the tiny passages of the nasopharynx of a newborn infant.

The technic of securing the cultures is fairly simple. The baby or child should be placed on a table or bed with the head extended over the edge. It is wise to restrain the patient so that flailing arms and legs will not interfere with the maneuver. The swab is passed gently through the floor of the nose and, with an upper twist of the wrist, led into the nasopharynx. The distance the cotton tip of the swab is advanced is roughly the distance from the tip of the nose to the tragus of the ear. The swab should be held in the nasopharynx for thirty to sixty seconds if possible. Coughing or choking during the procedure results in a more satisfactory culture. The swab should be quickly removed and taken to the laboratory as soon as possible. If there is a delay in taking the culture to the laboratory after obtaining the specimen, it is wise to keep the specimen moist by having a piece of damp sterile cotton or cellulose sponge in the bottom of the tube. The pertussis organism dries very quickly. In the laboratory, the swab should be planted on fresh diagnostic media. The several bacteria known to be etiologic agents in respiratory disease have different growth requirements. Therefore, the appropriate media for the various organisms should be available.

The differential media for the common pathogens in the upper respiratory tract are nutrient blood agar, chocolate agar, and Bordet and Gengou's glycerin potato agar (a satisfactory media for *Bacillus pertussis*). Several important points in the preparation and use of this medium are necessary to bring about successful culturing. The culture base can be prepared in bulk, sealed well, and stored for six months or longer. The following formula is used in the laboratory of the Department of Pediatrics, University of Texas Medical Branch: peeled potato, 200 gm.; chemically pure glycerin, 16 cc.; Bacto agar, 48 gm.; NaCl, 8.6 gm.; distilled water, 1,600 cc.; nicotinic acid, 20 mg. per liter, which equals 32 mg. per 1,600 cc.

Boil sliced potatoes in half the volume of water and glycerin until soft. Strain through 8 thick-

nesses of gauze. Make up to 800 cc. with additional distilled water. Add the salt agar, nicotinic acid, and remaining 800 cc. of water. Boil all this for a few minutes to dissolve the agar. Restore to volume of 1,600 cc. with hot distilled water. Dispense 160 cc. per bottle. The bottles are autoclaved, sealed, and stored. Pyrex nursing bottles are satisfactory for this purpose. For use, place a bottle of solid medium in boiling water to melt. Cool to 50° C. and add penicillin solution to make 0.2 units per cubic centimeter of medium. Include the 30 cc. of blood that will be added. The blood should be freshly drawn and never over one week old. Fresh horse or sheep blood may also be used. Pour 25 to 30 cc. per plate. Store plates in the icebox. Do not use after seven days, since they become too dry.

Commercial media have not always proved satisfactory in obtaining cultures of the pertussis organism. The Powell charcoal medium gives good primary colony isolation but, in diagnostic work in which other pathogens are concerned, is not as useful as the Bordet-Gengou medium. The *B. pertussis* colonies characteristically appear after forty-eight or seventy-two hours. They may not appear, however, for as long as five days. These colonies are small, translucent, gray, and pinpoint in size. The medium becomes dark beneath the colonies, and hemolysis is seen only when the colonies are well developed. To make a complete bacteriologic diagnosis, the original swab should be planted in rich nutrient blood agar and chocolate agar plates as well as on plain nutrient agar. *Hemophilus influenzae* does not grow well on Bordet-Gengou medium. It may grow on blood agar, but its ideal medium is chocolate agar. It characteristically appears within twenty-four hours and can be differentiated from *B. pertussis* by the use of specific antiserum if there is any question as to its identity. Pertussis organisms rarely grow on ordinary blood agar and never on plain agar. *B. paraptussis* can grow on any of the three types of medium but grows profusely on plain agar, causing some brown discoloration of the medium. Other pathogens, such as pneumococci or Friedländer's bacillus, do not grow well on the Bordet-Gengou medium but certainly will not grow at all if the medium is properly reinforced with penicillin.

Bogdan¹¹ utilized a supralaryngeal method of collecting material for culture in the diagnosis of pertussis. He was able to combine this method with a modified nasopharyngeal swab method to obtain 84 per cent positive cultures in known pertussis cases. These swabs were sent to the bacteriology laboratory within three to five hours

after being obtained. In the preparoxysmal stage, a higher proportion of positive cultures was obtained than after the onset of paroxysms, thus indicating the value of swab diagnosis at this important stage of the disease. In carrying out his supralaryngeal swab technic, a straight wood or wire swab was used. The child's head was held well back to enable the swab to be held directly above the lumen or the upper end of the larynx. The tongue was depressed with a broad spatula, and the child was asked to cough. Direct positioning of the swab over the laryngeal outlet helps the doctor considerably in his attempt to obtain a freshly expectorated portion of mucus from the larynx. Using the supralaryngeal method combined with nasopharyngeal swab technic, in which a short nasal swab was passed into the nasopharynx and left there while the supralaryngeal swab was being taken, gave Bogdan the 84 per cent positive cultures in these known pertussis cases.

Jaffe utilized the method of Dr. J. B. Holland, chief of the Division of Bacteriology of the District of Columbia Department of Public Health, in obtaining cultures on her series of cases. The cough plate culture method was used. These cultures were prepared by holding a plate of medium directly in front of and about 6 in. from the child's mouth during paroxysms. Paroxysms were produced by exerting some pressure with the thumb on the trachea just below the cricoid cartilage.

Obviously, all of these measures have merit, and, regardless of the method, as proficiency is developed in taking the cultures, the incidence of positive cultures will be increased. It is well to note that only positive cultures are significant. A negative culture does not eliminate the possibility of pertussis. The pertussis organism is present in the nasopharynx early in the catarrhal stage of the disease and, in untreated cases, may be recovered up to the sixth week of the disease. It is most frequently isolated, however, in the catarrhal and early paroxysmal stages. Careful culturing may yield positive results even when antibiotic therapy has been used.

DIFFERENTIAL DIAGNOSIS

In spite of the difficulties involved in obtaining cultures of the pertussis organism, the final differentiation from other diseases must rest on bacteriologic proof. Many etiologic agents may be involved in causing a spasmodic nonproductive cough. *Bordetella parapertussis* causes a disease which is clinically indistinguishable from pertussis but is less severe than the typical pertussis course. *Hemophilus influenzae* and even

Hemophilus parainfluenzae may make a clinical differentiation difficult. Tracheobronchitis, bronchiolitis, and interstitial pneumonitis due to a variety of agents may give a spasmodic nonproductive cough. Foreign bodies in the larynx and trachea may well simulate pertussis. Severe paroxysmal coughing occurs in mucoviscidosis.

COMPLICATIONS

Complications of typical severe pertussis are well recorded in other references.⁷⁻⁸ Pertussis that has been influenced by prior immunization procedures or early use of antibiotics undoubtedly manifests fewer complications. However, the variations of pertussis that are seen in the infant cause severe complications. The frequency of these complications does not depend upon the severity of the disease but rather upon the age and susceptibility of the patient. By far the most frequent complication in this age group is the secondary bacterial invasion of the respiratory tract resulting in bronchopneumonia or pneumonia. The infant who has persistent vomiting is also more susceptible to malnutrition, weight loss, dehydration, and fluid and electrolyte imbalance. The disease itself, with or without the complications, is sufficiently severe in this age group to present the patient to the physician as a pediatric emergency.

ACTIVE IMMUNIZATION PROCEDURES

Immunization procedures do not confer immunity in 100 per cent of children, as has been mentioned, and are not without danger to the child. It is fair to assume that improperly executed immunization procedures involve more risk to the patient and confer immunity in a smaller percentage of cases. Each physician might well re-examine his present technic and compare it to the procedures recommended by the American Academy of Pediatrics Committee on the Control of Infectious Diseases.¹² The following is a partial reproduction of the committee's recommendations:

The following schedule is suggested for routine immunization of infants:

- 1 to 2 months of age—0.5 cc. triple antigen.
- 2 to 3 months of age—0.5 cc. triple antigen.
- 3 to 4 months of age—0.5 cc. triple antigen.
- 5 to 6 months of age—smallpox vaccination.
- 16 to 18 months of age—0.5 cc. triple antigen.

The committee recommends that all infants be immunized actively against diphtheria, pertussis, and tetanus with a course of injections of combined alum or aluminum phosphate precipitated or aluminum hydroxide adsorbed diphtheria and tetanus toxoid containing *B. pertussis*

vaccine. These products are considered preferable to fluid mixtures for the following reasons: (1) more prolonged antitoxic immunity produced by precipitated or adsorbed mixtures, (2) greater effectiveness as immunizers against pertussis in early infancy, and (3) less likelihood of producing systemic reactions because of lower protein content and slower absorption.

The presence of a local outbreak of pertussis may be an indication for attempted rapid protection against this disease. For this purpose, saline suspended *B. pertussis* vaccine should be used. Such a course of saline vaccine should be followed by one or more doses of triple antigen, as required to complete immunization procedures against diphtheria and tetanus. The additional pertussis vaccine is advised because of the relatively inferior and less long-acting immunity which follows rapid immunization with saline *B. pertussis* vaccine injected at short intervals. Certain details should be considered in the use of the preceding toxoid vaccine antigens. Combined immunization against diphtheria, pertussis, and tetanus should be commenced at 1 to 2 months of age. The initial course should consist of 3 intramuscular injections of antigen given at intervals of not less than one month and preferably not more than three months. An injection of a fourth dose of triple antigen is recommended about twelve months after the third dose. Injections should be made into either the deltoid or gluteus maximus muscles. During the course of primary immunizations, inoculation should not be made more than once at the same site.

Recall injections. Routine recall injections should be given one year after completion of the primary course of vaccine, two years later, and every three years thereafter. If the usual schedule is followed, these injections are administered at about 18 months of age, 3 to 4 years, and 6 to 7 years. Further injections usually are not given. Routine recall injections are given most conveniently in combination with diphtheria and tetanus toxoids.

Exposure recall injections. These injections are indicated following intimate exposure or during the presence of an epidemic providing the child has not had a routine recall injection in the past two years. Saline suspended *B. pertussis* vaccine given subcutaneously in doses of 4 National Institute of Health units is the agent of choice.

Saline suspended *B. pertussis* vaccine is useful in attempted rapid protection during epidemics of pertussis. A total of 12 NIH units divided into 3 equal doses of 4 NIH units (0.5 cc.) each should be injected subcutaneously at intervals

of one week when rapid protection is important. Greater or more prolonged immunity is achieved when injection can be given at longer intervals, such as three to four weeks. When rapid protection is not particularly important, vaccines mixed with adjuvants are preferred, especially in the infant under 6 months of age.

Alum precipitated or aluminum hydroxide adsorbed *B. pertussis* vaccine is preferred to saline suspended vaccines for primary immunizations of infants under 6 months of age when there is no particular need for attempted rapid protection and when the infant already has received inoculations against diphtheria and tetanus or a contraindication to the use of the combined triple antigen exists. Inoculation may be commenced at any time after the first month of life.

Conditions in which immunization procedures are contraindicated:

1. Any respiratory or other acute infection.
2. Cerebral damage in infants. Severe febrile reactions with or without convulsions may be encountered. In such infants, active immunization procedures should not be commenced until after 1 year of age. Single antigens rather than the usual multiple antigens are recommended, and fractional doses should be employed.

Precautionary measures:

1. Both needles and syringes must be sterilized between each injection. The use of one syringe with change of needle only between injections is not considered safe. Sterilization should be accomplished by autoclaving, by dry heat for two hours at 170° C., or by boiling water for not less than fifteen minutes.
2. The skin should be clean and should be swabbed with 2 per cent tincture of iodine, a mercurial of equivalent strength, 70 per cent alcohol, or tincture of Zephiran chloride 1:1000. The 2 per cent tincture of iodine is preferred.
3. The rubber stopper of the antigen container should also be disinfected.
4. Antigens containing alum or aluminum hydroxide in general are injected intramuscularly.
5. Antigens without adjuvants (fluid toxoid and saline suspended vaccines) in general are given subcutaneously except in special instances; for example, cases in which intracutaneous injections are specified.
6. Fat necrosis along the track of the needle may occur less frequently if the outside of the needle is not coated with antigen and the injection of antigen is followed by an injection of 0.1 to 0.2 cc. of air. It seems possible that a number of cysts formed from the injection of multiple antigens may result from the use of contaminated syringes.

7. Only well infants should be injected.

8. Acetylsalicylic acid, 65 mg. per year of age, should be given within an hour or two after the injections and repeated four hours thereafter if necessary.

9. Infants with histories of febrile convulsions should be injected with fractional doses of antigens. Doses are begun in the range of 0.05 to 0.1 cc. to test tolerance. Phenobarbital in appropriate doses may be useful in addition to acetylsalicylic acid in preventing convulsions following the injection of fractional doses of antigen.

10. When an infant is brought in for his second injection, the parents should be questioned in regard to the occurrence of fever, somnolence, and local reaction after the previous injection. If these are reported, the volume of the next injection should be decreased appropriately. If a convulsion or a severe reaction is reported, no further injection should be given for several months and then single antigens only should be used beginning with fractional doses to test tolerance.

In this section on active immunization procedures, a word of discussion is warranted on Jaffe's series of pertussis cases in immunized children. The poor protection offered by vaccination in this series may have been due in part to the variable potency of the vaccine used. These patients apparently were vaccinated before the recent increase in each lot of pertussis vaccine to 12 Pittman units per total immunizing dose. Dr. Jaffe collected her series of 100 cases in 1953 and 1954. It is still upsetting to realize that all children immunized prior to this time may be susceptible to pertussis in spite of their series of immunizations. Sauer,¹³ in commenting on this series of cases, has said that to attain prolonged active artificial immunity against pertussis, it is obligatory to administer an adequate amount of potent pertussis antigen in the primary series of three monthly injections. The quality of the antigen is probably even more important than the quantity specified on the package. A complete immunization should not be less than 12 Pittman units, which is the equivalent of 90,000 million *B. pertussis* bacilli of the National Institute of Health's standard pertussis vaccine. To maintain antigenicity, antigen should be stored at 2 to 10° C., but freezing must be avoided. For full dosage, the vial should be well shaken each time before withdrawal. In attempting to explain the failures in Dr. Jaffe's series, Sauer has postulated the following reasons. Impotent (nonantigenic) vaccine may have been used. Refrigeration may have been inadequate as a result of prolonged and repeated interruptions

of refrigeration. Other reasons mentioned were outdated, insufficient dosage, delay or omission of routine recall or exposure recall doses, poor technique, exposures before immunity was attained, wrong clinical diagnoses, and wrong bacteriologic diagnoses.

TREATMENT

In order for antibiotic treatment to be successful, it must be instituted early in the course of the disease. Early and effective treatment depends upon early and accurate diagnosis. Diagnosis depends entirely upon the competence of the bacteriologic laboratory facilities. The American Academy of Pediatrics recommends that pertussis immune serum be used intramuscularly, or even intravenously, in critically ill patients in the dose of 20 cc. daily or every other day for a total of 60 to 100 cc. Hyperimmune gamma globulin may be used intramuscularly in the dosage of 2.5 cc. daily or every other day for a total of 7.5 to 12.5 cc. The committee feels that broad-spectrum antibiotics are useful as an adjunct to therapy, particularly in the prevention and treatment of complications due to secondary bacterial infection. In serious cases, one of these antibiotics should be used in conjunction with serum therapy. Nonspecific treatment for the seriously ill child, especially the infant, is of paramount importance. Constant nursing attendance for the use of mechanical lifesaving measures is essential. Such measures include insertion of airway, suction, and the oxygen tent. In the tent, oxygen in the concentration of 50 per cent, humidity in the concentration of 40 per cent, and temperature of 68° F. are advised. Important nonspecific measures for less seriously ill children are rest, fresh air, expectorants for daytime, and sedation at night.

SUMMARY

In spite of the statistical evidence that the incidence of pertussis is decreasing, this disease is still important for several reasons. The mortality rate in infants is still high. Some immunized children may still be susceptible to the disease. Broad-spectrum antibiotics are effective if used in the early stages of the disease. Use of antibiotics prior to an attempt to establish a positive etiologic diagnosis may make later attempts unsuccessful. The following suggestions are in order concerning the problem under discussion. Knowledge of the atypical forms and variations of the clinical picture of pertussis may make the entity easier to suspect. Actual diagnosis is dependent upon isolation of the etiologic agent. The physician must provide local

means for carrying out bacteriologic isolation of *B. pertussis*. In carrying out active immunization procedures, correct knowledge of technic, precautions, contraindications, and immunization schedules may markedly increase the effectiveness of the immunization program. All parents should be encouraged to have the complete immunization program for their infants. The physician should consider pertussis as a possibility in all cases of upper respiratory infection, especially in the infant and young child.

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JAUNDICE occurring in children with allergic reactions may be caused by hemolysis rather than by damage to the liver cells or by allergic spasms within the biliary tract.

In a 13-year-old boy and a 7-year-old girl, jaundice was associated with reduction of hemoglobin, rise of indirect-reacting serum bilirubin, and subsequent reticulocytosis. No liver cell damage was found by laboratory tests. The parents of both patients had allergies, and the children were sensitive to a variety of foods and pollens.

The boy had had eczema since the age of 2 months, asthma since the age of 3 years, and frequent rhinitis. Hemolytic episodes were provoked by chrysanthemum pollen, the inhalant test for tree pollen, and the scratch test for carrots. Jaundice appeared, and total serum bilirubin rose from 0.8 to 2.5 mg. per 100 cc., the indirect-reacting fraction rising from 0.7 to 2.2 mg. per 100 cc. The hemoglobin level fell from 11.6 to 9.8 gm. per 100 cc., and the relative number of reticulocytes increased from 0.6 to 3.3 per cent.

The girl's reactions were more complex. Apparently, repeated exposure to small amounts of antigens produced slight, chronic, hemolytic anemia, which was exaggerated by massive exposure. She was admitted to the hospital with asthma, eczema, and jaundice. Red cells had a short life and increased fragility, with low resistance to hypotonic saline, as in spherocytosis. Ingestion of cucumbers, candy, mushrooms cooked with cream, and fish produced fever, nausea, jaundice, and dark urine. However, exposure to egg, tree pollen, feathers, and dogs or cats provoked asthma, rhinitis, and eczema without jaundice.

M. BARR, S. KRAEPELIEN, and R. ZETTERSTRÖM, Karolinska Hospital, Stockholm. *Acta paediat.* 47:113, 1958.

Pterygium Syndrome (Status Bonnevie-Ullrich)

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CERTAIN COMBINATIONS of congenital malformations occur with a frequency higher than expected by chance. This is undisputed in conditions like mongolism, the Laurence-Moon-Biedl syndrome, dysostosis craniofacialis, or arachnodactyly.

Less well defined are combinations of abnormalities primarily involving mesodermal structures which have been described in the European literature as "status Bonnevie-Ullrich" or "pterygium syndromes." A number of patients with webbed neck, cubitus valgus, and infantilism were described in the American literature by Turner¹ and are now recognized as usually being associated with gonadal dysgenesis. Patients with arthrogryposis multiplex congenita appear to belong to this general group of patients with pterygium syndromes according to Rossi and Caffisch.² We have observed one patient who had arthrogryposis multiplex and other congenital deformities which we have classified as pterygium syndrome.

REPORT OF CASE

An 11-day-old male infant was first admitted to the Mayo Clinic and pediatric service in the hospital because of deformed wrists, feet, and knees and respiratory difficulties. The mother had noted less fetal activity than in previous pregnancies. During this pregnancy, the mother had gained a total of 42 lb.

The patient's birth was normal, and his birth weight was 9 lb., 11 oz. The onset of spontaneous respiration was delayed, and later he had obvious respiratory difficulties and was cyanotic. The family history was non-contributory.

The infant's weight on admission was 3 lb., 6 oz.; his height was 18½ in., and the circumference of his head was 14 in. and that of the chest 13¼ in. He was cyanotic, and the oxygen desaturation became more intense with crying. He had a low hairline and low-set ears. Multiple telangiectatic areas were noted about the face. The mandible was hypoplastic. The neck was short, and webbing was prominent. No heart murmurs were heard. The testes had not descended into the scrotum, but the left testis could be felt in the inguinal canal. The following abnormalities of the skeleton were noted: scoliosis, deformity of the shoulders, limited abduction of the hips, and flexion deformities of elbows,

wrists, and left knee. The right knee was dislocated posteriorly. Both feet were clubbed.

A roentgenogram of the thorax revealed a pronounced elevation of the anterior portion of the diaphragm on the right. This was thought to represent eventration or herniation of the liver. A marked lower thoracic scoliosis with the convexity pointing to the left was associated with a gibbus formation (figure 1). No structural deformity of the vertebral bodies was noted.

Roentgenologic examination of the hips revealed dislocation of the left hip. The right knee was dislocated posteriorly, and many joints showed contractural deformities (figure 2).

The hemoglobin measured 23.6 gm. per 100 cc., and the leukocytes numbered 15,500 per cubic millimeter with a normal differential count. Urine was normal. A buccal smear disclosed that the nuclei were negative for sex chromatin, which indicated a male genetically. An electrocardiogram was interpreted as showing right ventricular hypertrophy. Studies of oxygen showed 80 per cent saturation while the patient was breathing room air with a decrease to 75 per cent when he was crying and an increase to 91 per cent saturation while he was breathing 100 per cent oxygen.

Subsequent Course. The patient continued to eat poorly and to have episodic cyanosis. During fifteen days in the hospital, he lost 100 gm. He was dismissed but had to be readmitted at the age of 6 weeks because of increasing respiratory difficulties. The weight was 7 lb., 7 oz. and the temperature 103° F. X-ray examination disclosed pneumonitis on the right. He was placed in oxygen mist and treated with a combination of penicillin and streptomycin. Despite these measures, his condition deteriorated gradually, and he died three weeks after he was admitted for the second time.

Necropsy confirmed the skeletal abnormalities. No gross abnormality of the central nervous system was noticed. The great vessels, coronary openings, and the pulmonary venous drainage all appeared in normal relationship. The ductus arteriosus was patent, and there was also a prepatent foramen ovale. The cardiac chambers appeared normal. The dome of the diaphragm on the right was at the level of the clavicle. The diaphragm was thinned at this point but had no actual defect in its continuity. The right lung was largely collapsed and the right lobe of the liver filled most of the space inferior to the right diaphragm. The dome of the diaphragm on the left was at the level of the fifth rib and appeared grossly normal. The genital organs were normal, but both testes were located in the inguinal canal. The microscopic examination added nothing; the gonads were normal male.

VARIOUS DESCRIPTIONS OF THE SYNDROME

Webbed neck was first described by Kobylinski³ in 1883. He called it "Flughaut" or "pterygium colli." Ullrich,⁴ in 1930, described an 8-year-old

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Fig. 1. Pronounced elevation of the right side of the diaphragm and lower thoracic scoliosis, with the convexity pointing to the left.



Fig. 2. Dislocation of the right knee and left hip.

girl with retarded growth who had a webbed neck, small mammillae, cubitus valgus, and bilateral ptosis of the eyelids. She had had edema in infancy, which Ullrich thought retrospectively to be lymphangiectatic edema. The 3 other patients from the Kinderklinik in Munich described in the same paper were 2 mongoloids with webbed necks and a third patient who had syndactylism and aplasia of the third, fourth and fifth nerves but certainly had none of the abnormalities described in the 8-year-old girl. In Ullrich's review of the literature, he found only 1 case similar to that of the 8-year-old girl whom he had observed. The other patient had webbed fingers and excessive axillary or popliteal skin folds which apparently were not associated with pterygium of the neck.

Nielsen,⁵ in 1934, described the syndrome of webbing of the neck associated with abnormalities of the cervical part of the spinal column

(Klippel-Feil disease). This combination was termed "dystrophia brevicollis congenita."

In 1938, without being aware of Ullrich's report, Turner¹ described 7 girls with webbing of the neck, infantilism, and cubitus valgus. In fact, the picture was identical to that in Ullrich's case. It is by now well recognized that most of the patients with this combination of symptoms have an external female habitus but have nuclei negative for sex chromatin, which indicates that they are genetically male. Between the ages of 9 and 12 years, the excretion of urinary gonadotropins is increased, and biopsy of the gonads reveals "gonadal dysgenesis."

Rossi,⁶ in 1947, first considered arthrogryposis multiplex or, as he named it, "pterygo-arthromyodysplasia," a related entity. Rossi and Cafilisch,² in 1951, reported on 2 patients with abnormalities of the extremities typical of arthrogryposis associated with webbing of the neck,

TABLE 1
THE GROUPS OF MALFORMATIONS CLASSED AS PART OF
THE "PTERYGIUM SYNDROME"

- I. *Status Ullrich bilateralis*
 - A. Webbing of the neck (pterygium colli)
 - B. Impairment of function of cranial nerves
 - C. Deformities of the extremities
 - D. Hypoplasia of the mammillae
 - E. Retardation of growth
 - F. Mental retardation
 - G. Lymphangiectatic edema
 - H. Telangiectasia
 - I. Cutis laxa and hyperelastia
 - J. Deformity of the thorax
 - K. Muscular hypotonia
 - L. Mushroom-shaped epiphyses of long bones
 - M. Malformation of ears, epicanthal folds and hypertelorism
- II. *Dystrophia brevicollis congenita*
 - A. Bilateral (or unilateral) pterygium colli
 - B. Vertebral malformation (Klippel-Feil)
 - C. Any malformation enumerated under I.
- III. *Turner's syndrome*
 - A. Bilateral webbing of neck
 - B. Cells without sex chromatin (males genetically)
 - C. Dysgenesis of gonads
 - D. Cubitus valgus
 - E. Any malformation enumerated under I.
- IV. *Status Ullrich unilateralis*
 - A. Unilateral or asymmetric pterygium (particularly of extremities)
 - B. Hypoplasia or aplasia of muscles in the areas involved by the pterygium
 - C. Any malformation enumerated under I.
- V. *Arthrogryposis multiplex or pterygo-arthromyodysplasia*
 - A. Unilateral or asymmetric pterygium of extremities
 - B. Aplasia of muscles
 - C. Ankylosis of joints
 - D. Any malformation enumerated under I.

scoliosis, multiple abnormalities of the vertebrae, cranial nerve defects, muscular hypoplasia, dislocation of the hip, and, in 1 case, cryptorchidism. This observation apparently prompted these authors to review the literature. They collected 177 case reports and added 20 cases which they encountered personally. Included in this group were patients with webbing of the neck and excessive folds of skin in the axillary, cubital, or popliteal region associated with various other malformations. This webbing was termed "pterygium colli, axillae, cubiti, or poplitei." Rossi and Caffisch proposed the term "pterygium syndrome" for this group of malformations and suggested a classification which we have modified slightly (table 1). It is obvious that many signs have been added to Ullrich's original criteria. Ullrich⁷ pointed out later that the syndrome he described is practically identical to Turner's syndrome, but it must be emphasized that the symmetric form of status Bonnevie-Ullrich has been observed also in boys. He divided the group of abnormalities to which his name was attached into 2 groups: those showing symmetric distribution and those showing asymmetric distribution.

COMMENT

The patient observed by us probably would fit best into the group of arthrogryposis multiplex or pterygo-arhromyodysplasia associated with features of bilateral status Bonnevie-Ullrich.

In reviewing the subject, we gained the impression that this group of abnormalities is by no means well defined and that there is a high degree of variability. It is remarkable that most abnormalities in this group concern mesenchymal

structures, and we are tempted to propose the alternate term of "mesodermal dysplasia."

Ullrich⁷ discussed the pathogenesis of this group of malformations in detail and suggested that they were caused by pressure from wandering blebs of cerebrospinal fluid, a mechanism shown to be responsible for an inherited complex of abnormalities in the house mouse by Bonnevie.⁸ Rossi and Caffisch, however, emphasized the importance of hereditary factors responsible for the pathogenesis of the pterygium syndrome.

SUMMARY

A patient was described who had multiple abnormalities of mesodermal structures, namely webbing of the neck, multiple telangiectatic spots, eventration of the diaphragm on the right, dislocation of the left hip, and arthrogryposis multiplex. The various forms of the pterygium syndrome have been discussed, and it is postulated that the case described belongs in this ill-defined group of congenital malformations.

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ABO incompatibility is the most common cause of congenital hemolytic disease. The Witebsky slide test is a valuable adjunct in the detection of ABO erythroblastosis. Antenatal determination of hyperimmune titers does not appear to help in diagnosis.

Blood from 1,125 sets of mothers and infants was grouped and typed. ABO incompatibility was found in 230 instances, and ABO erythroblastosis was detected using rigid criteria in 12 of these.

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Stabilization of Lower Tibial Fractures by Fixation of the Fibula

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THE GREAT MAJORITY of fractures of the lower leg are treated conservatively by manipulation and plaster cast fixation. Yet, in spite of the various procedures that aid in proper realignment, a few injuries do intermittently appear which, for one reason or another, preclude this conservative approach. The surgeon is then confronted with the distinct problem of doing the best he can by closed methods or of proceeding with a surgical reduction and fixation of the fracture fragments. This latter, more aggressive approach to the problem assumes certain fundamental drawbacks which must be weighed against a number of factors that immediately become involved. It is obvious that any open operative procedure tends to destroy the hematoma which has resulted from the injury, and the great preponderance of fractures that have required surgical fixation tend toward a delayed type of healing. Particularly important from this standpoint are the fractures involving the lower one-third of the tibia which may, even under optimum conditions, exhibit prolonged healing and, in some instances, non-union characteristics.

More recently, as an adjunct in the therapy of these injuries, attention has been directed toward the fibula, for this bone usually forms early callus and heals primarily without particular difficulty. The alignment and principal care has generally been directed toward the tibia as the main weight-bearing structure of the lower leg, with little concern felt for the lateral bony support. In some cases of severely comminuted fractures of the tibia, the fibula may only be in-

jured to a minor degree, but, in spite of this feature, little thought has been given to the value of this bone as a possible supporting strut. These comminuted fractures are generally not amenable to surgical fixation, and, to add to the problem, alignment is difficult to control in plaster supports. This presents a particularly disturbing problem if the fracture occurs in a patient whose lower extremities tend to be obese. By firmly stabilizing the fracture of the fibula, the adjacent structures of the lower tibia can be molded into near normal alignment without interfering with or destroying the hematoma that is initially present as the result of the interruption of the bony continuity. The fracture of the fibula may be surgically exposed and directly reduced without difficulty. Fixation can be accomplished by the Eggers slotted type of plate, but, in our hands, better structural support has been obtained by inserting the Rush type of intramedullary pin. On occasion, two pins must be inserted into the fibula in order to insure firm stabilization of the structure of the lower leg, which, in turn, permits a manipulative molding of the tibial fracture fragments without damaging interference with the hematoma processes. Other injuries that are amenable to similar treatment include those in which there is considerable soft tissue damage associated with a compound fracture of the tibia that may in the future need skin grafting and reconstructive endeavors. The fixation of the fibula permits repeated surgical procedures by retaining firm continuity of the structures. Still other types of injuries that can benefit from intramedullary fixation of the fibula are those involving fractures of the fibula, with lateral subluxation or dislocation of the foot. On occasion, a trimalleolar fracture-dislocation of the ankle may be encountered and treated

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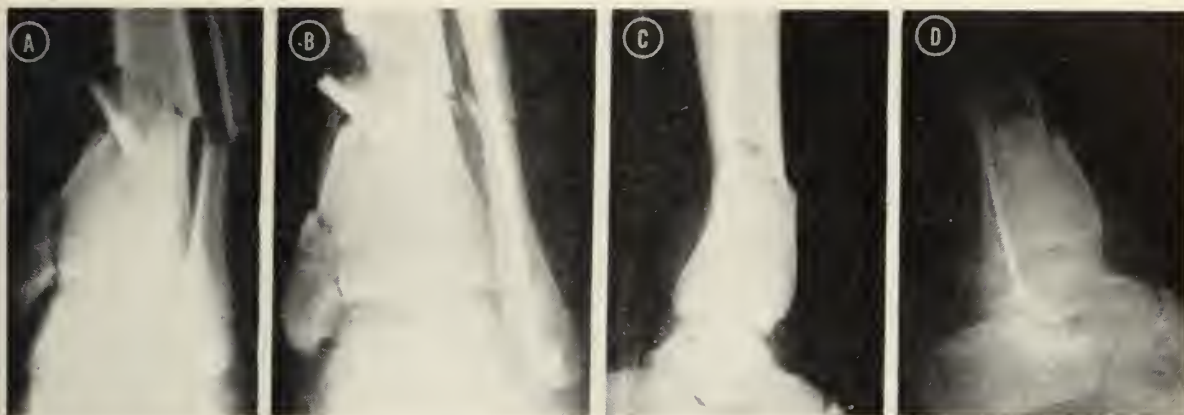


Fig. 1a. Fracture of lower tibia and fibula, anterior-posterior view. (b) Fixation of fibula with intramedullary pin and realignment of fracture fragments of tibia, anterior-posterior view. (c). Same fracture from lateral view. (d). Realignment of fracture from lateral view resulting from fixation of the fibula.

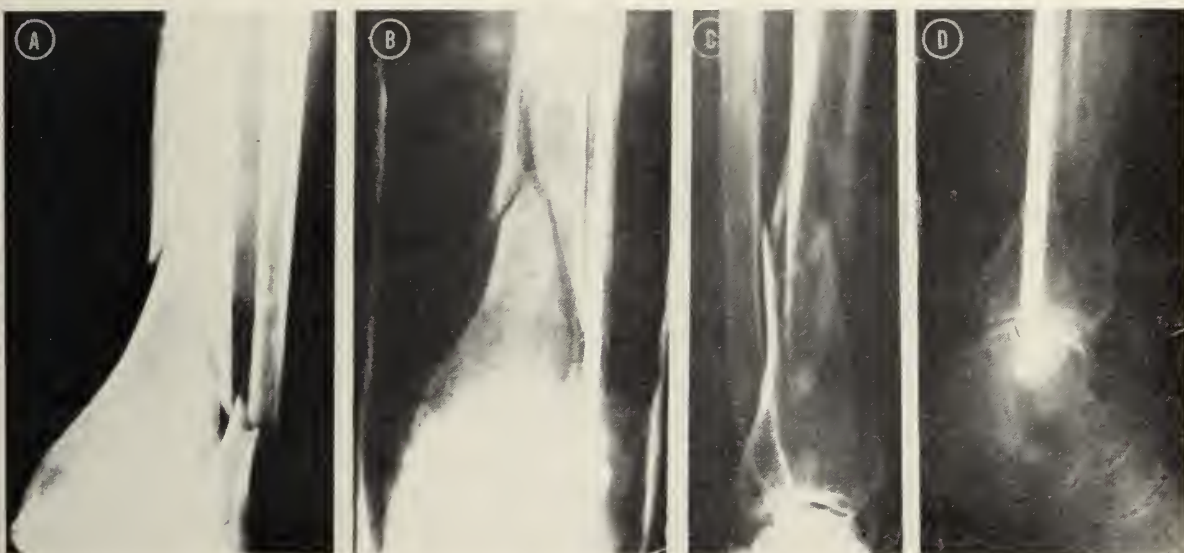


Fig. 2a. Comminuted fracture of lower tibia and fibula, anterior-posterior view. (b). Fixation of fibula with two intramedullary pins and realignment of tibial fracture fragments, anterior-posterior view. (c). Same fracture, lateral view. (d). Fracture fragments realigned satisfactorily by fixation of fibula.

successfully by carrying out this procedure.

Figure 1 represents the roentgenograms of a 16-year-old boy who was involved in an automobile accident, suffering a fracture of the lower tibia and fibula and a large avulsion of the lateral side of the foot. Fixation of the fibula retained the continuity of the structures so that normal realignment was obtained, and allowed for repeated surgical procedures, including skin grafting of the lateral side of the foot. An excellent result was obtained.

Figure 2 shows roentgenograms of an elderly, very obese woman with a comminuted fracture of the lower tibia and fibula that could not be retained in satisfactory alignment because of the pronounced obesity of the lower extremities. In this instance, it was necessary to utilize two in-

tramedullary pins which established excellent realignment of the fracture fragments and firm fixation of these structures. It was relatively easy, therefore, to change the cast from time to time without fear of losing the reduction that had been accomplished. Both of these fractures healed primarily without particular difficulty.

NOTE: The use of the fibula as a stabilizing mechanism in the control of lower tibial fractures was suggested a number of years ago by Dr. Wallace Cole, professor emeritus of orthopedic surgery at the University of Minnesota Medical School. It was also pleasing to learn during the fall of 1957 that Dr. George Eggers, who participated in a Continuation Course at the University of Minnesota, had established profound interest in the use of the fibula in injuries of a similar nature. Dr. Eggers, however, utilized his plate rather than the intramedullary fixation and obtained equally satisfying results.

Remunerative Heart Disease

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IATROGENIC HEART DISEASE has become popular. There is grave doubt, however, that, in the emotionally mature patient, the casual remark or overt comments concerning laboratory procedures and the like would produce a cardiac neurosis. It seems rather that the development of a cardiac neurosis or an individual's fixation upon his heart occurs only in those people who are emotionally immature. The iatrogenic phase of their illness represents the trigger mechanism that establishes the disability. It is also possible by virtue of emotional immaturity for a person with either a functional or organic lesion to refuse rehabilitation because the reward he receives from his illness is such that he cannot afford to be cured. It is suggested that this complication be entitled "Remunerative Heart Disease." These patients are well known to all, but the problems they create have received little emphasis in cardiology. Once a patient receives a great reward either psychologically or financially from his illness, he is difficult to rehabilitate. The following composite histories are offered as illustrations.

CASE REPORTS

Case 1. This patient is a woman of middle age who was told while attending high school that she had a "heart murmur." She accepted this statement and projected the term "heart murmur" into "heart disease." This individual had always been emotionally immature and had suffered from many emotional upsets. Once she had interpreted the heart murmur to mean heart disease, she had an explanation for her inability to carry on many of her scholastic duties. As a result, she avoided gymnasium courses and other wearisome extracurricular activities. She was, however, able to attend and participate in all the high school social functions. Because of her "condition," she was able to obtain all the sympathy she desired from both her family and friends.

When the patient married, it was explained to her husband that, because of her "heart," she would be unable to perform any housework and that pregnancy would be detrimental to her health. It was emphasized that servants would be required in order to protect her health. The patient by her own choice was taking rest hours during the day. After marriage, she attended all

social functions, such as club dances, and so forth, and yet was unable to participate in housecleaning, preparation of meals, and the like. Such activities always produced "heart distress." She became pregnant, and the pregnancy increased her dependence upon her "heart disease." Throughout the gestation, she remained almost a total invalid despite all efforts on the part of her attending physician to have her forget the heart murmur. She had a normal delivery, but she again required a prolonged convalescence before she could return to her "normal living." Her husband now had to provide a nursemaid to assist in the care of the child.

The husband's continued efforts to succeed in the business world necessitated a very pronounced increase in his social activities. The patient did not enjoy the company of his business associates and, as a result, was able to escape all her social responsibilities relative to business. On the other hand, she was able to accept all the social responsibilities that she desired from people in whom she was interested. As her husband's success increased, her demands increased. The more the business demanded of his time and the more social activities were required of her by virtue of his work, the more her illness became manifest. She required long periods of bed rest during the day; she had to have her meals in bed but could, when interested, attend social events without any evidence of "heart distress." At one time, her husband's business took him away from home for a period of time. During this interval, he met and became interested in a socially prominent woman. When his wife was informed of this situation, she had a severe "heart attack," which required hospitalization and the husband's immediate return home. Reviewing the situation with the patient and emphasizing to her the fact that her illness was of no consequence was met with antagonism. Her husband accepted his lot and finally decided it was better for all concerned that no effort be made to remove the "heart disease" from his wife.

This patient refused rehabilitation because both the psychologic and the monetary rewards she had received from this heart condition were too great. The "heart condition" had been her escape from facing the realities and responsibilities in life. She represents an emotionally immature person who has found the reward from her "heart disease" so great that she could not afford rehabilitation.

Case 2. Mr. X married when he was 18 years of age. He and his wife both worked in order that he could finish his high school course. Unfortunately, the patient never graduated from a recognized engineering school, and he was, therefore, without a degree in engineering. His associates, however, recognized his ability and, despite his lack of formal education in engineering, he became a leader in his chosen field. Nevertheless, he always felt inferior to his associates because of their education.

At the onset of the war, two of his associates entered the service, but he was unable to enter, since he had

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been declared essential by his local draft board. Without his two superiors, he did a brilliant job of developing the engineering processes in which they were interested. He became a recognized authority in his field. During this time, however, he became very bitter toward his superiors who were in the army. He resented their return because they would still be his superiors and, as he stated, "While they were in the army, I worked like a dog, and they will participate in the reward of increased production."

Near the close of the war, the patient sustained a mild myocardial infarction and was hospitalized for a period of time. Following his hospitalization, he returned to work on a part-time basis. He had occasional attacks of angina but nothing of great consequence. At this time, every effort to return the patient to his full-time activities failed. Whenever an unpleasant committee meeting was to be held, he suffered an "anginal attack" and had to go home. Any time he was requested to take a long business trip, he suffered an "anginal attack" and could not make the trip. Every time a controversial issue arose in the firm's processes, he suffered an "anginal attack" and had to go home. The patient, however, was able to enjoy physical and social activities without distress. The medical attendants were not sure that he had true anginal pain.

At this time, someone suggested to him that he should drink 1 oz. of whiskey three times a day in order to prevent heart attacks. In a short time, he was drinking one-fifth of whiskey daily and, many times, far in excess of this amount. Soon, he was constantly under the influence of liquor. His drinking became such a problem that he was hospitalized and treated for alcoholism. The patient refused the diagnosis of alcoholism but stated that, if the doctor thought he was an alcoholic, he would stop drinking immediately. He stopped drinking but became very nervous and tense. This period was followed by excessive use of nitroglycerin, barbiturates, and codeine preparations. All these were taken because of "my heart trouble."

When the patient's superiors returned from the service, he notified them that, because of his heart disease, he would not be able to continue with them but that he was going to open his own small engineering office and carry on a limited type of work. He developed a very successful business. His wife and children were his associates in the business. He had one of his sons attend engineering school so that he "would not be han-

dicapped like I was." When his son finished the engineering school, he was brought into the family business. As soon as the business was well established, the patient began to have recurring attacks of "angina." During any controversial issue, he had a "heart attack," and his son had to carry on the business. When the son married, his father insisted that his son build a house near him, "in case I have a bad heart attack." As each child married, he built a house for them in the neighborhood, "to be handy in case Pa has trouble."

As time went on and business burdens increased, the father did less and less work but maintained complete control of the business. He had gained control over the lives of both of his sons-in-law and his daughter-in-law. A comment not uncommon when the family met to discuss a business venture was, "Don't upset Pa as he will have an attack." One son-in-law in a fit of temper suggested that the attacks were faked, whereupon his father-in-law had a severe attack, fell to the floor, and was taken to a hospital supposedly dying. When seen in the emergency room, he was hyperventilating and demanding oxygen and medicine to stop the "terrible pain in my heart." All laboratory tests and examinations were normal. After leaving the hospital, the patient was unable to make any business trips by car, but he made prolonged automobile trips to all parts of the country on vacations. The winter months were spent in warm climates because the "cold weather always causes more heart attacks."

Every effort to rehabilitate the patient has failed. Both his monetary and psychologic rewards are so great that he cannot be cured.

CONCLUSION

Some individuals with either functional or organic heart ailments receive monetary or psychologic rewards to the extent that they are unable to accept rehabilitation. The cardiac disease is not the cause of the patient's disability. These people are emotionally immature, and their "heart disease" is their escape from the vicissitudes of life. Since the disability results from a reward the patient receives, we suggest that this disability be termed "Remunerative Heart Disease."

Recognition and Management of Borderline Organic Psychosis

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A REPORT in the August 1955 issue of *The Practitioner*¹ emphasizes the importance of early recognition of all psychoses, since early therapy is obviously more effective and disasters, such as suicide, violence to others, financial or social ruin, and inanition or accidental injury, are less apt to occur. The organic psychoses are characterized by physicochemical changes which involve the cortex of the brain, causing symptoms of intellectual deterioration and psychopathology. Patients with these psychoses differ from those with the so-called functional psychoses in that the former have pathology in the brain and elsewhere and show intellectual defects, whereas, in functional mental illnesses, deterioration may be based on lack of interest.

There are three important points in the organic reactions: namely, the presence of pathology in the cortex and elsewhere, the nature and extent of the changes in intellectual functions, and an evaluation of the individual's prepsychotic and psychotic personality. Pathologic changes must involve a large area of the cortex either directly or indirectly to cause mental illness. Subcortical lesions, particularly, if small in size, are usually without psychosis. Acute reactions, such as occur as a result of infections of the brain or after excessive use of alcohol, are usually a reversible type of pathologic reaction. In the more chronic conditions, such as degenerative or arteriosclerotic changes in the brain, the psychoses are more likely to be irreversible.

From a clinical point of view, the patient with the organic syndrome may, in the early phase of his illness, appear to have a functional illness, as some nervous systems are much more susceptible to damage from toxins, infections, and so forth than others.

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Kraines² offers probably one of the most clear, concise etiologic classifications of the organic syndromes.

1. Toxic conditions related to alcohol or drugs and various systemic diseases, endocrinologic dysfunctions, and vitamin deficiencies are included in this category.

2. Infections of the brain due to specific infections, such as syphilis, tuberculosis, and meningitis, and mixed infections secondary to ruptured brain abscesses are in this group.

3. Degenerative processes are the most common and largest group and include the arteriosclerotic and senile psychoses and degenerative neurologic diseases.

4. Mental illness produced by trauma to the head is relatively rare in comparison to the actual number of head injuries that occur. Trauma elsewhere in the body is not included in this group.

5. Neoplasms of the brain rarely cause mental illness unless a large cortical area is involved either directly or indirectly through increased intracranial pressure or reduced blood supply to a cortical area.

The organic psychoses depend upon the severity of the reaction or the pathology, the susceptibility of the brain to the processes, and the involvement of a large area of the cortex. All of these etiologic factors produce both intellectual and personality changes. Therefore, as detailed a history of the patient as possible is of the utmost importance to enable us to recognize the early or borderline symptomatology of this organic process. A detailed life history up to the time of the onset of the illness would be ideal to compare and evaluate with the changes found on examination.

The intellectual symptomatology is related to (1) changes in recent and remote memory, (2) disorientation, and (3) defects in general information, mathematical ability, reasoning, ability to learn, planned action, and judgment.

These defects indicate cortical damage, which mental and psychological examinations will further

substantiate. Specific local symptoms and signs may also occur on physical and neurologic examination, depending on the location of the pathology. The speed with which the process develops also changes the findings as is apparent in a case of acute alcoholism as compared to one of chronic senility.

Personality changes vary from the extreme extrovert to the extreme introvert. Involvement of the cortex interferes with controlled intellect and learned habits. Therefore, the underlying personality comes out, and, in the organic reaction, it varies according to the prepsychotic personality. The introverted or extroverted personalities are exaggerated. The mental reaction in the organic syndrome can, therefore, take any form: for example, schizoid, manic, grandiose, paranoid, and so forth.

The patient's type of personality during the organic process is not diagnostic of any condition nor is the intellectual defect. However, defects in these fields indicate cortical pathology is present but fail to indicate its type.

The symptoms of the organic psychosis accordingly fall into three categories: (1) those that involve areas other than the cerebral cortex as revealed by findings on neurologic or physical examinations, x-rays, or laboratory work, (2) those indicating intellectual defects, which are all similar, and (3) those indicating personality changes, which are dependent on the prepsychotic personality and its subsequent exaggera-

tion. By establishing these three findings, the diagnosis can be made.

Treatment of the organic syndrome is directed toward the underlying pathology, which may or may not be specific. Theoretically, to remove the pathology and thereby bring about recovery is ideal. Obviously, we must settle for somewhat less than this. Possibly, in toxic conditions, infections, or tumors affecting the cortex, excellent results may be obtained on early diagnosis by removing the pathology. In the degenerative diseases or trauma to the cortex, chronicity may be encountered which further emphasizes the need for early diagnosis and more effective treatment, although treatment may not be curative.

In the older age groups, occupational therapy and recreational therapy are useful within the capacity of the individual. The prophylactic benefit of regular physical, neurologic, and laboratory examinations to prevent infection, inanition, and exhaustion and keep vital functions at an optimum is always indicated. From a psychologic point of view, it is of the utmost importance to give the individual a feeling of belonging and of being needed and wanted. Sometimes this is of more value than a great deal of medication.

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IN ADULTS, the first requirement for diagnosis of the onset of epilepsy is establishment of the authenticity of the epileptic seizures in contrast to abnormal psychogenic behavior.

In addition to careful questioning and physical examination, air encephalograms, cerebral arteriograms, or both, are helpful diagnostic aids. In unusual cases, blood sugar determinations, tests for hypoparathyroidism, and renal function studies may be diagnostic.

An etiologic factor was determined in 55 per cent of 1,000 patients. Of these, 25 per cent had primary or secondary tumors. Vascular lesions were next in number. The association of migraine and epilepsy was common and may be accompanied by easily recognized vascular abnormalities. Head injury was also relatively frequent.

The less ordinary causes were neurosyphilis, disseminated sclerosis, alcoholism, brain abscess, pregnancy, internal hydrocephalus, subacute bacterial endocarditis, leukemia, and hypoglycemia.

SHEILA SHEEHAN, M.D., United Sheffield Hospitals, England. *Irish J. M. Sc.* 5B:261, 1958.

Of Melanin and Melanomas

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"Always in me, a black spot not so big as a pinhead but wanting to spread and destroy me in the fullness of time, all the rest of me as sound as a bell."

THE WILL, Sir James Barrie

RENE THEOPHILE HYACINTHE LAENNEC¹ first described the clinical entity of malignant melanomatosis, coined the term "la melanose," and characterized the condition as a rare form of cancer. His appraisal of its rarity has been substantiated by modern oncologic surveys. The melanoma constitutes but 1 per cent of all human malignancies and 4 per cent of all skin cancers.² This neoplasm may arise in the skin, eyes, or meninges. Subsequently, it seeds metastatic cells in widespread visceral and body sites. In most instances, an early death ensues.

The tumor derives its name from the Greek word, "melas," which means black. It is composed of pigment cells which oxidize the amino acid tyrosine into the brown-black pigment, melanin.

The melanoma poses an interesting investigative problem. There has been much speculation as to its histogenesis, its biochemical and endocrinologic facets, and its prevention and treatment.

HISTOGENESIS OF THE MELANOMA

The histogenesis of this pigmented neoplasm has been the subject of vigorous debate. All authorities agree that the epidermal melanocyte, formerly called melanoblast,³ is the cell source of the malignant melanoma and its benign predecessor, the pigmented junctional nevus. The debate centers about the origin of the melanocyte, the enzyme-bearing and pigment-producing cell located in the basal layer at the epidermal-dermal junction of normal skin.

In the late nineteenth century, Unna⁴ introduced the term, "Abtropfung," to refer to the "dropping-off" of cells from the stratum germinativum into the corium. Thus, the epidermal origin of the various forms of pigmented nevi

was accounted for as well as the malignant transformation of these nevi into melanomas. Bloch,⁵ in 1926, substantiated this theory by the "dopa test," wherein certain basal cells enzymatically oxidized dihydroxyphenylalanine into an insoluble brown pigment, melanin. These dendritic cells, called dopa-positive melanocytes, contributed to the formation of pigmented nevi and melanomas. A year before in Scotland, Dawson⁶ reaffirmed the basal cell origin of these tumors. Peck,⁷ studying the melanogenic effect of thorium x on human skin, concluded that the dendritic melanocytes proliferate after such stimulation. In his opinion, the only function of these cells was to form melanin. He considered the dendritic cell merely a special junctional phase of nondendritic basal cells.

During the same period, Masson^{8,9} proposed that these skin lesions be called neuronevi, since he believed they were the result of local proliferation of nervous tissue and resembled the Merkel-Ranvier tactile nerve terminals of the epidermis and the Wagner-Meissner corpuscles of the dermis. He felt that all these structures were primarily of Schwann's sheath cell origin. He asserted that there were two types of basal cells: the nonpigment forming palisade cell and the true melanocyte derived from Schwann's sheath. Ewing¹⁰ concurred with Masson in this thesis. In 1932, Foot,^{11,12} using detailed trichrome stained sections, demonstrated nerve fibers in melanomas and a striking similarity between the bundles of collagenous tissue ("lames foliacées" of Masson) seen in intradermal nevi and normal Meissner corpuscles.

Becker,¹³⁻¹⁵ and Becker, Jr. and associates¹⁶ maintained that the melanocytes were not derived from cells of the germinal layer but were similar to neurons and of independent neural origin. They thought that they arose as modifications of the "cellules claires" of Masson. The latter are thought to be equivalent to the tactile terminals of Merkel-Ranvier corpuscles and the only cells to possess enzyme function. They observed that these cells sent their pigment-filled, branched, cytoplasmic processes about the other basal cells, giving the latter the appearance of pigment-producing activity also.

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Biologists and embryologists have offered a third theory, which involves the migration of pigment cells from the embryonic neural crest through the corium, ultimately to reside in the basal layer of the epidermis as dendritic melanocytes. DuShane's work with amphibia,^{17,18} Eastlick's with chick embryos,¹⁹ and Rawles' in both the general field of neural crest transplantation and, particularly, mammalian embryos^{20,21} have broadened the horizons of this problem. Zimmerman and Cornbleet²² have shed further light on this hypothesis by their study of the Negro fetus. They agree with Masson that the dendritic pigment cells are synonymous with "cellules claires" and with Becker that ordinary basal cells do not form pigment but instead engulf the melanin formed by the melanocytes. Lerner and Fitzpatrick²³ support the neural crest origin of the melanocyte with the additional observations that these cells (1) stain with nerve tissue stains, such as silver, gold, and methylene blue; (2) produce dopa, which is structurally very similar to epinephrine; (3) exhibit no response to therapeutic irradiation; and (4) are associated with central nervous system abnormalities, such as Recklinghausen's neurofibromatosis and café au lait spots. Davis and Pack²⁴ found that cutaneous nevi were more sensitive than normal skin to thermal radiation and interpreted this finding as being supplementary evidence of a neurogenic origin.

Within the last decade or more, there has been renewed interest in Unna's epidermogenic theory. Allen²⁵ and Allen and Spitz²⁶ asserted that Masson's "cellules claires" were merely modified basal cells capable of melanin formation—not nerve terminals of neural crest origin. Upon studying ultra thin sections of skin fixed in osmic acid, Pease²⁷ speculated that the "cellules claires" may be only basal cells which have developed a watery cytoplasm. He agreed with Allen that "cellules claires" are not the only source of pigment and that not all melanocytes are clear cells. Allen accepts the neurogenic theory in regard to blue nevi and meningeal and choroidal melanomas. But, as noted before, he strongly refutes its application to epidermal nevi and melanomas. Montgomery and Kernohan,²⁸ studying 460 nevi, concluded that the nevus cell or melanocyte probably has multiple modes of origin but that Unna's theory seems to predominate. However, they saw evidence of its neuroepithelial origin, since "lames foliacées" are present in 10 to 20 per cent of all nevi.

The continuing coexistence of these three histogenic theories illustrates the scope of the problem of cell origin and the need for clarification.

A nevus is a congenital blemish of either a pigmented, vascular, hidradenous, or sebaceous nature.²⁹ In this discussion, it refers to a benign neoplasm derived from pigmented, dopa-positive, epidermal melanocytes.

The pigmented nevus is generally considered the precursor of the malignant melanoma.

Junctional nevus. Allen and Spitz³⁰ state that the brown-to-black, flat, hairless junctional nevus precedes the stage of malignant degeneration in 90 per cent of melanomas. The junctional nevus is distributed evenly over the body, though it is the only kind found on the palms, soles, and genitalia where there are grossly few nevi but many melanomas. Histologically, this nevus is characterized by the proliferation of melanocytes at the epidermal-dermal junction.

Compound nevus. This brown, slightly elevated, usually hairless nevus accounts for 98 per cent of children's nevi and 12 per cent of the nevi in adults. Its capacity for neoplastic change contributes to 4 per cent of all melanomas. It is observed most often on the trunk. The downward proliferation of junctional melanocytes into the corium, where other nevus cells already reside, comprises the microscopic picture of the compound nevus. Masson¹ cited the double origin of this lesion as consisting of a "dropping-off" of epidermal melanocytes combined with a persistent upward proliferation of dermal schwannian sheath cells.

Intradermal nevus. This is the "common mole," which may be polypoid, dome shaped, sessile, or papillomatous,³¹ with or without hair, and is considered in its pure form to be incapable of malignant change. Woodburne,³² on the basis of a case of a hairy mole which underwent malignant degeneration, refutes the concept that a hairy nevus invariably offers an excellent prognosis. Dobson³³ also reported the fifth case of a malignant melanoma developing in a prepubertal hairy nevus. It must be reiterated that there is no evidence that the pure intradermal nevus ever develops into cancer.³⁴ Such a statement does not apply to the compound nevus, which is really an intradermal nevus with junctional change above in the epidermis. Every nevus should be considered potentially malignant.

The common mole is found on the head, neck, and trunk but more frequently on the former two sites. It is identified histologically by the presence of nevus cells in the dermis proximal to, yet separated from, the epidermal-dermal border by collagenous connective tissue. Allen²⁵ maintains that these dermal melanocytes are the result of an epidermal downgrowth, while Mas-

son³⁵ favors a Schwann-cell origin. These may represent the late phase of neval evolution, since so few compound nevi are seen in adults after the age of 30.

Blue nevus. This is a blue to blue-black macular or dome-shaped lesion typically found on the buttocks, dorsum of the hands or feet, and the face. It is very rarely malignant, though sometimes misdiagnosed as a melanoma. Allen and Spitz²⁶ have seen only 6 instances of malignant blue nevi in all their case studies. Spindle-shaped melanocytes occur in whorls and fascicles deep in the corium without overlying junctional involvement. Thus, they resemble the neurofibroma and Mongolian spot of infants. Most authors accept the neural origin of this nevus, although this assertion has never been proved. Others,^{36,37} believe that it is of mesodermal origin, a view so far unsubstantiated. The melanin pigment is contained in enzymatically active melanocytes as well as melanophages. The latter engulf melanin and contain no enzyme capable of oxidizing tyrosine or dopa to melanin and are, therefore, called dopa-negative. The rare malignant blue nevi show, in addition to the usual criteria of malignancy, transformation of the spindle cells into epithelioid cells. It is of interest that the blue color is due to the presence of pigment cells deep in the corium in the absence of melanin in the epidermis.³⁸ Incident white light is transmitted through the epidermis to the dermal pigment, which absorbs almost all the red light and reflects only the blue light. The latter is scattered back to the observer's eye, rendering the lesion's gross appearance blue.³⁹

Lentigo maligna. Also called "senile freckle" because it does not appear before the second or third decade of life, this small, brown, macular nevus exhibits a pronounced capacity for malignant change. Typically, such change occurs slowly and metastasis is late. Lentigo maligna is typically situated on the dorsum of the arms or hands of elderly persons. Histologically, the benign form shows no junctional proliferation; heavily pigmented intraepidermal neval cells are found in acanthotic, clubbed rete pegs; melanocytes are cast off at the outer surface of the stratum corneum. Only in the malignant form is any junctional change seen.

Freckle. The freckle is differentiated grossly from the junctional nevus by its smaller size, usually only 1 mm. in diameter, and by its distribution on those regions of skin exposed to sunlight. Microscopically, only an increase in pigmentation of the basal-layer cells is found without proliferation of the melanocytes. It is entirely benign.

LIFE CYCLE OF THE MELANOCYTE

The melanocyte begins its histologic life in the basal layer of the epidermis. The next phase, "Abtropfung," accounts for the junctional proliferation at the epidermal-dermal border. This, perhaps, is the reason why 98 per cent of children possess either junctional or compound nevi. During this phase, the nevus attains the maximum amount of pigment. It is an interesting observation that, despite this microscopic precancerous change, prepubertal children enjoy a seemingly endocrine-linked immunity to malignant transformation of nevi.

Differentiation occurs throughout life with further cellular downgrowth adding to the intra-dermal mass. The solid mass of nevus cells in the corium causes the grossly raised appearance of most adult nevi. Because the "Abtropfung" has already been completed, most older nevi are of the common mole variety. Only 12 per cent of adults have compound nevi as against 98 per cent of children. As the nevus ages, the size and number of inflammatory cells increase, and vascular changes take place in its vicinity. At the same time, pigmentation, junctional proliferation, and mitotic figures decrease.⁴⁰ One of the most interesting findings is the complex neuroid change the nevus cells undergo. The increased number of fibrillar and nerve-like elements causes the nevus to acquire a very close resemblance to the Wagner-Meissner corpuscles. Thus, the aging nevus shows schwannian characteristics regardless of what its true origin may be.

BIOLOGY OF THE MALIGNANT MELANOMA

Fortunately, the melanoma is rare; yet, it seems to compensate for this fact by its very malignant nature. The lesions are both pigmented and non-pigmented. The latter are termed amelanotic melanomas. It is primarily a disease of adults and occurs most often between the third and seventh decade, attacking both sexes equally.

Race. The tenet was once held that the dark-skinned races were less susceptible to this neoplasm.⁴¹ Now it is felt that these races, the Negro in particular, do not possess an immunity to the melanoma.^{42,43} The African native seems to have a higher incidence of this disease than the American Negro, with the foot frequently involved. Clinical impression suggests that, in the Bantus at least, the lesion is less virulent.⁴⁴ In these cases, the pathology is localized to the regional lymph nodes and lymphatic chains without distant metastases.

Genetics. Gordon⁴⁵ and Gordon and associates⁴⁶ studied the genetic aspects of melanotic and amelanotic neoplasms in fish. There is evi-

dence that heredity is important in the development of melanomas in other members of the animal kingdom also.⁴⁷ Denaro⁴⁸ has proposed that dominant or partly dominant genes may control the inheritance of pigmented nevi. Cawley⁴⁷ presented 3 cases of cutaneous melanomas in the same family, an occurrence unlikely to be due to chance alone. There have been a few cases of ocular melanoma in which a hereditary factor may have been present.⁴⁷

Pathogenesis. The initiating factor or factors in the pathogenesis of the melanoma remains unknown. Ewing¹⁰ suggested that traumatic stimulation of cutaneous nerves initiates the metamorphosis of specific cells of sensory nerve terminals into melanomas. De Cholnoky⁴⁹ and Hall and associates⁵⁰ suggested trauma to a previously benign pigmented nevus as the causative factor. The latter reported such a situation in 44 per cent of their cases. Trauma in this sense would consist of chronic contact irritation caused by constrictive clothing, shaving, nervous habits, and so forth. Improper therapeutic measures, such as incomplete excision, electrodesiccation, and carbon dioxide snow, constitute traumatic incidents also. No matter what their concepts of melanocytic origin are, all workers in this field agree that trauma is a very important factor in the pathogenesis of malignant melanomas.

Since ultraviolet irradiation acts as a photocatalyst in the oxidation of tyrosine to melanin,⁵¹ sunlight has been incriminated. There are several reports of malignant melanomas occurring in patients with xeroderma pigmentosum,^{52,53} a hereditary disease afflicting adolescents and young adults and characterized by hypersensitivity to ultraviolet light.

Pack⁵⁴ has strongly favored an endocrine factor. The relative benignity of the prepubertal melanoma as compared with the adult melanoma seems to support his contention. Malignant-looking juvenile melanomas rarely metastasize and kill. Pregnancy, with its high blood level of hormones, seems to accelerate both the transformation of nevi into melanomas and the rate of metastasis of melanomas. A more complete presentation of the endocrine aspects of this problem will be given later.

Traumatic, solar, and hormonal agents have been cited but not yet conclusively proved to be responsible for melanomatous degeneration.

Location. Ackerman⁵⁵ and Hall and associates⁵⁰ reported that 65 per cent of their cases of cutaneous melanomas arose from a pre-existing pigmented nevus. Pack and co-workers analyzed the distribution of benign pigmented nevi and melanomas and found that 13 per cent of all nevi

and 29 per cent of all melanomas were located on the head and neck. On the upper extremities were 39 per cent of all nevi and 11 per cent of all melanomas. Only 17 per cent of all nevi were on the lower extremities, but 30 per cent of melanomas occur here. The melanoma is the most common cutaneous malignancy of this region. The remainder of epidermal melanomas develop on the trunk.

Szabo⁵⁷ correlated the frequency of melanomas in various sites with the local density of dendritic melanocytes. He found significant differences in the number of such cells in various regions in different individuals. He has not studied the density of these pigment cells on the feet and genitalia—common sites for melanomas—but an investigation should prove interesting.

Prognosis. It is impossible to generalize when discussing the prognosis of the melanoma for there are too many exceptions. The over-all five-year survival rate is 15 to 25 per cent. Various factors modify these figures. Early lymph node metastasis occurs in 50 per cent of the cases. With negative nodes, the 5-year survival rate is 40 per cent; with positive nodes, 14 per cent.⁵⁸ Early diagnosis and prompt therapy exert a pronounced influence on prognosis.⁵⁹

Hall and associates⁵⁰ attempted to correlate the stages of progress of the disease and rate of cure. Stage I, small localized lesions with either increased pigmentation or slight enlargement, had an 82 per cent five-year survival. Stage II, still localized but with infectious, hemorrhagic, and ulcerous degeneration, showed a 45 per cent survival. Stage III, characterized by regional adenopathy exhibited an 11 per cent cure. Stage IV, which had progressed too far for surgical intervention, had no five-year cures. Spontaneous ulceration of the lesions indicates a grave outcome.⁶⁰ Twelve times as many patients with ulcerated lesions were dead after three years than were those with the nonulcerated variety. Ulceration seems to depend upon the size, age, and growth rate of the tumor.

Women generally have a much better prognosis than men. Their cosmetic interests bring exposed lesions to the attention of the physician much sooner. As for age, the paucity of prepubertal fatalities should be reiterated. By contrast, Pack⁵⁴ stated that between puberty and 25 years of age, the survival rate is only half that of older persons.

The site of the malignancy makes quite a difference in prognosis. Lesions of the mucous membranes are very serious because they are not well exposed to the patient's eye, may be asymptomatic until quite late in the course of the dis-

ease, and, thus, are diagnosed too late for adequate surgical treatment. Melanomas of the torso are serious because treatment of lymphatic dissemination is quite difficult. The extremities, because of localization and ease of surgical therapy, and the head and neck areas, because of early diagnosis, offer better prognoses.^{61,62} Wright⁶³ studied 222 cases of ocular and cutaneous melanomas and found that the survival rate was 63 per cent for five years and 40 per cent for ten years. This is two and three times better, respectively, than the cure rates for his series of cutaneous melanomas. However, the ocular melanomas are typically dormant for long periods, with metastases occurring as late as fifteen years after the initial therapy. Quite often, the entire disease process can be eradicated with simple enucleation.

Attempts have been made to grade these neoplasms histologically, although many experts feel that this is fallacious. Allen²⁹ and Allen and Spitz³⁰ stated that very superficial malignant changes present a considerably better prognosis than deeply infiltrating melanomas. The former may be difficult to differentiate from active junctional nevi.

In view of the highly invasive properties of this neoplasm, the type of treatment greatly affects the eventual outcome. Too conservative therapy is often merely palliative when it could have been possibly curative.

To conclude this discussion of prognosis, it should be mentioned that there have been instances of long survivals following simple excisional therapy.⁶⁴⁻⁶⁶ Several cases of spontaneous regression of melanomas have also been reported.^{67,69}

MELANOMATOSIS OF CHILDHOOD

Much has been written about this problem, particularly as it concerns a possible endocrine factor in the stimulation of melanomatous carcinogenesis. Because of the difficulty in histologic distinction between prepubertal or juvenile melanomas and the adult neoplasms, many investigators wondered why the preadolescent type so rarely resulted in death.⁷⁰ It was logical that the relatively hypohormonal milieu of the child was thought to be the answer. Pack⁷⁴ reported that in 900 of these so-called juvenile melanomas, there were no metastases to regional nodes until after puberty. McWhorter and Woolner⁷¹ later distinguished between the juvenile melanoma and the true malignant melanoma of childhood. The latter was morphologically identical to the adult lesion. They characterized the juvenile melanomas as possessing only occasional mitotic

figures, less pigment, and significant looking giant cells in the corium. Hendrix⁷² maintained that diffuse junctional proliferation of basal cells are found in the juvenile melanomas, whereas distinct nests of such cells are seen in truly malignant prepubertal lesions.

It is felt that most juvenile melanomas eventually transform into the intradermal type of nevus. Probably 5 to 10 per cent of all children's nevi are juvenile melanomas.

Therapeutically, it is important to render an accurate diagnosis of the excisional biopsy specimen.⁷³ If the juvenile melanoma is diagnosed, the treatment is already completed. If truly melanomatous, the surgeon will wish to undertake more radical treatment.

Dobson³³ cited 18 authentic cases of malignant melanomas in children, of whom only 2 lived longer than five years. One of these patients died of a malignant melanoma which developed in a hairy saddle nevus. This occurred in a 2-year-old Negro girl and is further testimony that not all hairy nevi are benign. Hendrix⁷² and Williams⁷⁴ both reported strikingly similar cases in preschool children. Again, the pathologic change was noted to be junctional proliferation in an isolated focus of a large, hairy, saddle nevus which had been present since birth. Of the aforementioned cases and several others reported,⁷⁵⁻⁷⁷ there was only 1 instance of proved hormonal imbalance and precocious puberty.⁷⁸

It is interesting to conjecture about the case reported by Sweet and Connerty.⁷⁹ They presented an infant with a congenital bathing trunk type of nevus, which developed antenatal melanomatous metastases to the skin, liver, and brain. Could it be possible that the maternal hormones exerted adequate stimulation to cause malignant degeneration of the benign nevus?

It is difficult to evaluate this problem. Lesions which at one time were thought to be microscopically identical to adult melanomas, yet clinically benign, are now held to be histologically distinctive. Perhaps, the endocrine hypothesis is unnecessary to explain their benign nature. The fact that only 1 case of true childhood melanoma exhibited an abnormal endocrine status adds further to the enigma concerning hormonal carcinogenesis.

MELANOMA AND PREGNANCY

The course of melanomatosis during pregnancy provides more substantial ground for those exponents of endocrine melanomagenesis. Many cases in the literature cite the activation of benign nevi or the accelerated progression of already malignant lesions during pregnancy.⁸⁰⁻⁸⁴

The well-known chloasma of pregnancy serves as ample evidence of the hormonal control of pigmentation. An interesting observation is the elevated level of urinary melanocyte-stimulating hormone (MSH) detected during pregnancy.⁸⁵ Normally, only 48 units of MSH per day are excreted. During pregnancy, 100 to 300 units per day are eliminated.⁸⁶ This pituitary principle will be further discussed later in this paper.

Four proved cases have been reported of placental metastases from maternal primary lesions with subsequent transplacental inoculation of the fetus with melanomatous tissue.⁸⁷⁻⁸⁹ In these instances, the liver via the umbilical vein and the lungs via the ductus venosus are the optimum sites for metastatic seeding.

The prognosis of a malignant melanoma diagnosed during pregnancy is quite poor. The realm of hope and optimism lies in good prophylactic care. Dangerous looking nevi in trauma-prone areas should either be completely excised and examined or very closely watched. If a nevus does degenerate during gestation, further pregnancies should be postponed, if possible, until more adequate treatment can be rendered.

BIOCHEMISTRY OF MELANIN FORMATION

The dendritic cells of the basal layer produce melanin. The accepted terminology now denotes these specialized cells as melanocytes and the connective tissue cells that ingest the pigment as melanophages.³ Species of the lower vertebrate line adapt their skin color to their environment by contraction and dispersion of pigment granules in the cells termed melanophores.^{3,90} The latter cells are not thought to actually manufacture melanin.

The biochemical aspects of melanin formation have intrigued many pigment and cancer investigators. Lerner and Fitzpatrick have probably contributed the most to this field.⁹¹

At the turn of the century, hemoglobin was thought to be the precursor of the pigment seen in melanotic skin tumors.⁹² Now tyrosine is accepted for this role. Bloch,⁹³ in originating the much used dopa-test, illustrated the presence of an enzyme in the melanocytes. According to his concept, this enzyme oxidized exogenous dopa to visible pigment. Thus, the enzyme came to be known as dopa-oxidase. The enzyme tyrosinase had been isolated in fungi, plants, insects, and marine animal tissue. Only of late has it been demonstrated in human beings.⁹⁴ Now it is strongly maintained that tyrosinase, not dopa-oxidase, is the essential enzyme. It has been suggested that the intracellular enzymatic activity is confined to the cytoplasmic mitochondria.⁹⁵

This enzyme is active when linked to a copper ion.^{96,97} In this regard, the interesting clinical observation of hypercupremia has been made in several cases of melanosis due to inanition.⁹⁸ Various antimetabolites inactivate the enzyme system by binding the copper moiety of the tyrosinase-copper complex.²³

Fitzpatrick⁹⁹ has found partially inhibited enzyme systems in actively proliferating junctional nevi. In melanotic and amelanotic melanomas, he observed very active systems as determined by histochemical and oxygen uptake studies.

Tyrosine singularly catalyzes the slow oxidation of tyrosine to dopa and the rapid oxidation of dopa to dopa-quinone. From the latter compound through several intermediate steps to the eventual melanin polymer, the reactions require no enzyme and are, thus, auto-oxidizable. The dopa formed in the first phase of the complete reaction also seems to accelerate its own formation from tyrosine¹⁰⁰ (figure 1).

In addition to the organic and inorganic compounds binding copper, several compounds structurally related to tyrosine impair melanogenesis by competitive inhibition.¹⁰¹ Other agents have been observed to block the enzyme system also.¹⁰²⁻¹⁰⁵ Therapeutic possibilities so manifested have been investigated without striking success.

The effect of ions on pigment formation is interesting. The heavy metals, mercury, silver, and gold in ionic form, compete with copper for the active centers on the apotyrosinase of the enzyme complex. For this reason, they have been used by dermatologists as depigmenting agents.¹⁰⁶ In vivo, the chloride anion depigments the hair of black mice.¹⁰⁷ Attempts have been made to link this phenomenon to the pigmentation of Addison's disease. However, the decrease in plasma chloride levels is probably not enough to account for the observed skin darkening.¹⁰⁸ It had been postulated that normal chloride levels inhibit the auto-oxidation of ascorbic acid with subsequent high blood levels of this reducing agent.¹⁰⁷

Ascorbic acid functions throughout the body as part of the hydrogen transfer system in oxidation and reduction.¹⁰⁹ Specifically related to melanin pigmentation, it seems to reduce the very dark oxidized form of melanin to the tan-colored reduced pigment.¹¹⁰ All of the vitamin C must be utilized before the oxidation of tyrosine can commence. Clinically, there seems to be a correlation between the melanosis of adrenal insufficiency and subnormal blood ascorbic acid levels.¹¹¹ Therapeutically, vitamin C has been used to depigment dark skin.^{112,113}

From his studies of the Cloudman S-91 mouse

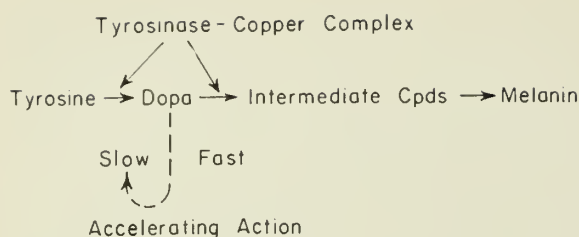


Fig. 1. Effect of the tyrosinase-copper complex and dopa on melanin formation.

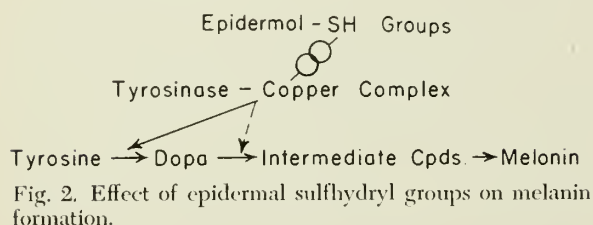


Fig. 2. Effect of epidermal sulfhydryl groups on melanin formation.

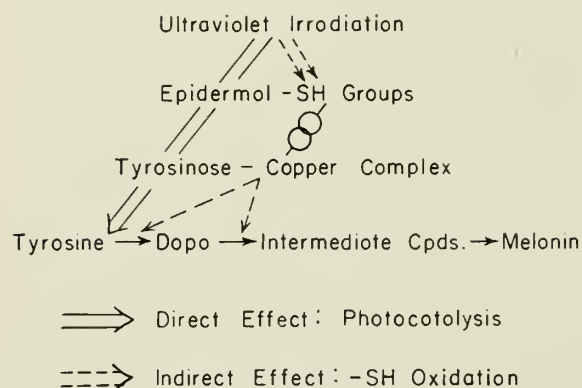


Fig. 3. Effect of ultraviolet irradiation on melanin formation.

melanoma, Greenstein and associates^{114,115} have characterized melanin as an insoluble protein-bound compound of a minimum molecular weight of 20,000. The protein, a pseudoglobulin, possesses a high percentage of sulfur-containing amino acids.

The widely accepted reason for the normally inhibited state of tyrosinase in the melanocyte is the presence of sulfhydryl (-SH) groups in the skin. Flesch and Rothman¹¹⁶ and Rothman and associates¹¹⁷ showed that extracts of human epidermis, which inhibit the oxidation of tyrosine to melanin, were counteracted by iodoacetamide (a sulfhydryl poison), thus illustrating the presence and action of the -SH groups. The -SH groups are thought to combine with the copper radical of the enzyme complex and so inactivate tyrosinase (figure 2). Melanogenic stimuli, such as solar light, x-ray, heat, inflammation, and skin

disorders effect their action by oxidizing or destroying the -SH groups.¹¹⁸ In Caucasian skin, the -SH level far exceeds that of Negro skin, and, in the depigmentary disorder, vitiligo, the -SH content of the epidermis is increased.¹¹⁸ Further evidence favoring the -SH group theory is the inhibition of the enzymatic oxidation of tyrosine by small amounts of glutathione (GSH).¹¹⁹ ACTH is thought to inactivate -SH groups and depress blood levels of GSH.¹²⁰

Solar irradiation has been incriminated as a possible etiologic factor in melanogenesis as well as general pigmentation reactions. Ultraviolet irradiation acts as a photocatalyst in the transformation of tyrosine to dopa.^{51,121} Then the dopa so formed catalyzes the enzymatic oxidation of amino acid to the pigment polymer. As mentioned before, ultraviolet light is also thought to oxidize epidermal -SH groups, thus freeing the enzyme complex from inhibition (figure 3).

The melanin formed by the various melanocytic sites in the body is subject to the dynamic equilibrium characteristic of other physiologic systems. The pigment is lost via the skin when it degenerates into a yellow pigment, melanoid, found in the stratum corneum.³⁹ Less is excreted in the gastrointestinal tract. Very little is found in the kidneys except in diffuse, intense melanomatous diseases. In the latter, the pigment is observed in the Henle loops and collecting tubules and may actually form pigment casts.¹²² In severe cases of metastatic melanoma, diffuse slate gray skin and melanuria may be very helpful diagnostic aids. The striking skin condition is due to pigment deposition within dermal melanophages. Melanin granules cannot permeate capillary membranes but circulating tyrosine intermediates can. These intermediate compounds, usually quinones, are derived from the melanocytes of primary or metastatic tumor masses. Either in the extracellular fluid or within histiocytes, the quinones are oxidized to actual melanin, perhaps by the cytochrome system.³⁸ These same melanogens or melanin itself are also found in the urine. After standing for a short time, the quinone compounds will be auto-oxidized to melanin, giving the brown hue of melanuria.

Thus, the major components for melanin synthesis are the amino acid substrate, tyrosine, the copper-tyrosinase enzyme, and molecular oxygen.¹¹⁰ The presence of dopa catalyst, epidermal -SH groups, temperature, pH, redox potential, and electrolyte concentration constitutes modifying factors in vitro but as of yet unsubstantiated clinical significance.

The complete oxidation reaction is presented in figure 4.

ENDOCRINE PHYSIOLOGY OF MELANOMATOSIS

The implication of the glands of internal secretion as the trigger to melanotic neoplasia has already been broached upon in this paper. Although no conclusive evidence can be elicited, the endocrine system is clinically implicated in postpubertal and obstetric melanomatosis.

The melasma of pregnancy and Addison's disease certainly indicates that hormones are related to melanin hyperpigmentation. There is

ample evidence of the same phenomenon occurring in the animal kingdom.¹²³⁻¹²⁵ Hyperpigmentation and melanotic neoplasia are, however, still very different entities despite the biochemical similarity.

Gonadal hormones do not play as important a role in human pigmentation as in animal melanogenesis. Estrone has been shown to antagonize the *in vitro* inhibitory effects of glutathione on melanin formation.¹²⁶

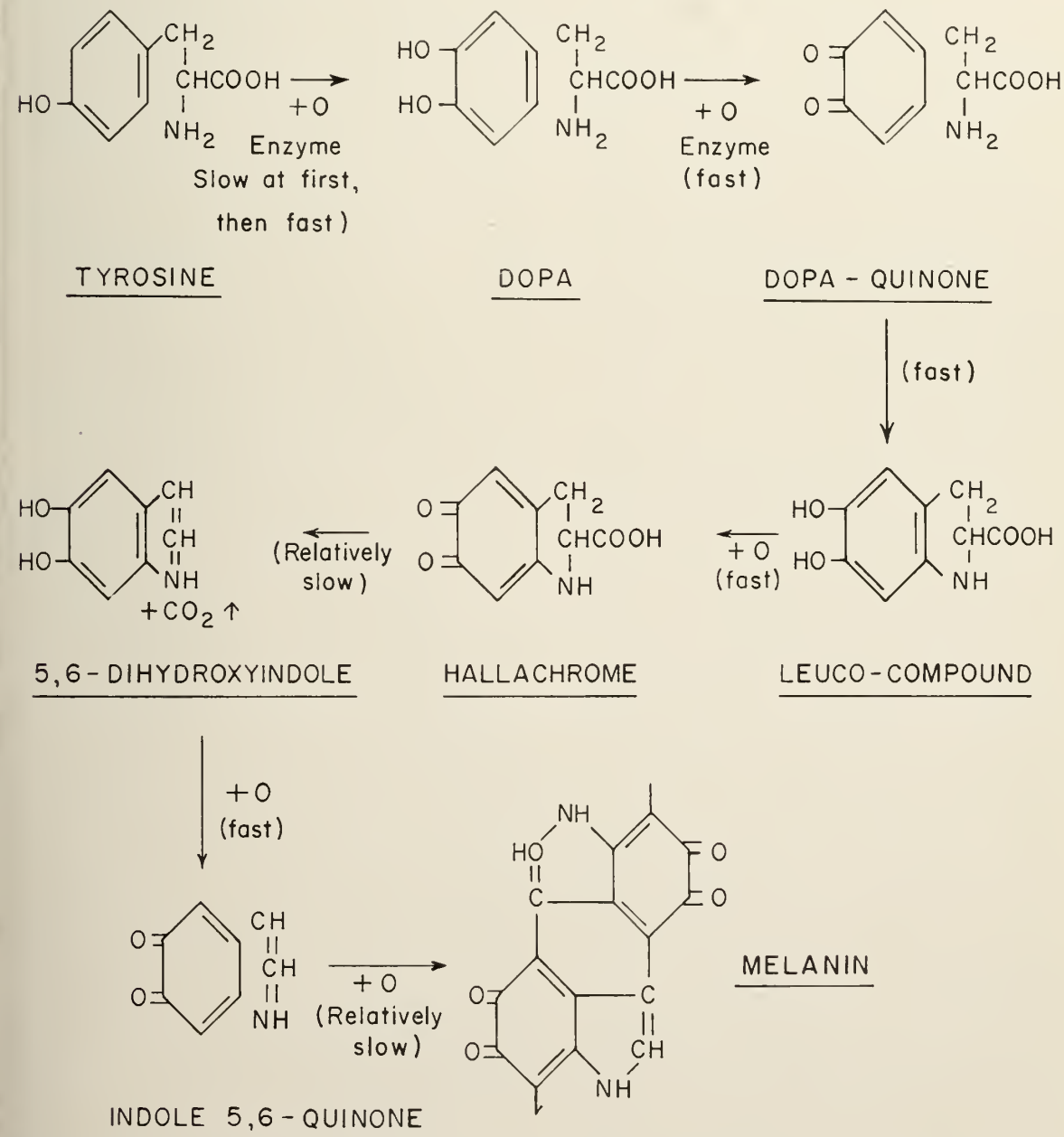


Fig. 4. Formation of melanin from tyrosine. (From LERNER, A. B.: Metabolism of phenylalanine and tyrosine. *Advances Enzymol.* 14:73, 1953).

The greatest amount of speculation now centers about the pituitary gland. Smith and Allen, in 1916, observed that hypophysectomized frogs lost their normal skin color; later, Zondek stated that pigmentation in amphibia was mediated by an intermediate lobe substance called intermedin.¹²⁷ In other lower vertebrate classes without distinct intermediate lobes, this hormone was found in either the anterior or posterior lobe. The little intermedia tissue that is present in human beings is found in the pars anterior, and its role in mammalian physiology is unknown.¹²⁸

In man, an ACTH complex has been designated as the melanogenic factor. Prolonged administration of corticotrophin was shown to not only increase skin pigment but also stimulate the spontaneous appearance of junctional nevi.¹²⁹ Spontaneous appearing nevi have been observed in children subjected to infectious diseases or other stress situations.⁸⁶ It was postulated that there was a chemical overlap between ACTH and the previously mentioned melanocyte-stimulating hormone, MSH.¹³⁰ This polypeptide linkage was thought to be similar to that of the posterior pituitary principles. So, ACTH seemed to exert its melanogenic function because of MSH contamination.

Improved fractionation procedures allow for isolation of an MSH preparation from hog pituitary glands that contains very little ACTH activity.¹³¹ Heating with alkali eradicates ACTH activity but not the physiologic function of MSH.⁸⁶ Both anterior and posterior hog pituitary may be used, but the latter provides 10 times more extractable hormone. With the ACTH-MSH complex thus fractionated, ACTH possesses only its inherent target organ effects and MSH only its melanogenic activity.¹³²⁻¹³⁴ Hudson and Bentley¹³⁵ extracted this substance from the pituitary gland of a woman treated for mammary carcinoma and injected it into intact male toads. Compared with substandard powder, the extracted material, although exhibiting some activity, was much less potent as a melanophore expander.

Shizume and Lerner⁸⁵ have developed techniques for blood and urine determinations of MSH. They have noted increased levels of this hormone in pregnancy, Addison's disease, and retinitis pigmentosa. Other references¹³⁶ include patients with melanomas in these categories. The author is not aware of any statistically adequate series of melanoma patients in whom these determinations have been made. Since corticoids depress MSH levels and bilaterally adrenalectomized patients have high levels, a reciprocal pituitary-adrenal axis has been postulated.⁸⁵ Further clinical indication of the pituitary origin of MSH

is the hypopigmentation and decreased blood levels of this hormone observed in Simmonds' disease. It is also interesting that darkening of the skin has been seen in cases of acromegaly as well as one recorded case³⁷ of a malignant melanoma associated with this endocrine disorder.

Intermedin is known to control the dispersion of pigment granules in melanophores of fish and amphibia, but the physiologic mechanism of MSH in man is unknown other than the indirect reversal of glutathione inhibition of *in vitro* melanin formation.¹³⁸ Of itself, MSH does not oxidize glutathione. Although high levels of serum copper are found in pregnancy and Addison's disease, MSH does not experimentally induce such an elevation.⁸⁶

Despite the conclusive evidence implicating MSH as an important factor in melanogenesis, virtually no proof exists of its importance in melanotic carcinogenesis. Clinical observation warrants serious consideration of the endocrine glands as pertinent to the melanoma problem, but a great deal of interesting investigation remains to be performed.

MELANOMATOSIS AS A MULTISYSTEM DISEASE

The malignant melanoma may occur in practically every site and organ in the body. Whether the malignancy in many of these locations is a primary lesion or a metastasis is still debatable.

Eye. Four of every 10,000 patients seen in the ophthalmologist's office present an ocular melanoma.¹³⁹ It is most common in adults from 40 to 60 years old and, like the cutaneous melanoma, is seen rarely, if ever, in children. Eighty-five per cent of the melanomas are choroidal; 9 per cent are located in the ciliary body and the remainder in the iris.¹⁴⁰ They are seldom found in the optic disk.¹⁴¹

In the contiguous conjunctival tissue, Reese¹⁴² described the conditions of precancerous and cancerous melanosis. Pigmented foci within the globe, comparable to epidermal nevi, are often observed and thought to be the predecessors of melanomas.¹⁴³ The iris is a common site for these ocular "nevi." Because of the occasional association of iridic freckles with uveal melanomas, the former take on diagnostic significance.¹⁴⁴

When the diagnosis is made early and enucleation is performed, the prognosis is quite good. However, long intervals between initial therapy and eventual metastases are very common in this form of melanomatous malignancy.¹⁴⁵ Metastases are most often seen in the liver and are, thus, hematogenous and present the diagnostic triad of a prosthetic eye, hepatomegaly, and melanuria.

The histogenesis of ocular melanoma is no less obscure than that of melanomas elsewhere in the body. Dawson⁶ maintained that the melanocytes found in uveal melanomas migrated from the retina to the choroid. It is true that the retina is pigmented at five weeks and the choroid at five months in utero.¹⁴⁶ Ingalls¹⁴⁷ states that because choroidal melanomas are located in the path of the ciliary nerves, they should be attributed to a schwannian sheath cell origin. Because of the embryonic homology between the choroid and the meninges, the origin of ocular pigment cells has also been speculated to be mesodermal in nature.² Absolute proof is lacking for all of these theories.

Histologically, intraocular melanomas are composed of spindle and epithelioid cells, the pure spindle cell lesions being less malignant.¹⁴⁸ The presence of pigment and reticular fibers in the lesions also seems to alter the prognosis. Scant pigment and heavy reticulin content improve the outlook.¹⁴⁹

The aforementioned precancerous and cancerous melanosis resembles diffuse junctional cell proliferation microscopically.¹⁵⁰

Symptoms are varied with visual defects. Pain, tenderness, and ophthalmoplegia are common complaints. Examination of the fundus usually provides the diagnosis as retinal detachment; the tumor mass itself and gross pigmentation may be observed. When fundic examination is unsatisfactory, the use of radioactive phosphorous (P^{32}) with subsequent Geiger counter determinations may be very helpful.¹⁵¹

Enucleation of the eye for intraocular disease and exenteration of the entire orbital cavity contents for conjunctival melanosis constitute acceptable therapy.

Central nervous system. Melanocytes are abundant in the pia mater of the ventral medulla oblongata.¹⁵² Consequently, many meningeal melanomas are thought to be primary malignancies. It is true, however, that metastatic melanoma from other primary sites frequently involves the brain. Clinical observation indicates that a primary meningeal melanoma rarely gives rise to visceral implants. Suspicious neurologic findings occasionally may be substantiated by the detection of melanin pigment or melanoma cells in the spinal fluid.¹⁵³ Accurate diagnosis must be based on histologic examination, as grossly pigmented meningiomas may be confused with the neoplasm in question.¹⁵⁴ Surgical and x-ray therapy have been attempted without much success.

Ear. Although few cases involve the external, middle, or internal ear, the possibility of such a

location should be mentioned in a complete review of systemic melanomatosis.¹⁵⁵⁻¹⁵⁶ Only by radical surgery can one hope to effect cure or palliation.

Respiratory tract. In the past, only a few cases have been reported of primary lesions in the nasal and paranasal sinuses.¹⁵⁷ However, no microscopic evidence was offered to certify these lesions as primary in nature. Very possibly, these cases exemplify instances of metastases from undiscovered lesions elsewhere.

Moore and Martin¹⁵⁸ have recently presented 9 histologically certified instances of primary nasal and paranasal sinus melanomas. Four cases of primary laryngeal melanomas are also recorded in the literature.^{158,159} Such observations are not surprising as these organs are lined with pseudostratified squamous epithelium, which is very similar to epidermal epithelium.

Pulmonary metastases are not uncommon findings, but there have been no reports of a melanoma arising from bronchial epithelium.

Nasal discharge, obstruction, a visible mass, hoarseness, and dyspnea may be the signs and symptoms of respiratory tract melanomatosis.

To date, irradiation and surgery have effected no cures.^{157,158}

Gastrointestinal tract. Since melanocytes and nevi have been observed in the oral mucosa, the potential for a primary lesion to occur in this location is certainly present.^{160,161} Although ulceration often destroys evidence of junctional change, many lesions present the latter as suggestion of their primary nature.¹⁶² Ninety per cent of these tumors are found on the palate and the maxillary alveolar process.¹⁶³

Esophageal melanomas have engendered the academic debate from which the histologic criterion for differentiating primary and secondary lesions has been established. The presence of overlying junctional proliferation of the esophageal squamous cells indicates a primary focus. Twelve well-documented cases of supposed primary melanoma of the esophagus are on record, but only 7 satisfy the accepted criterion.¹⁶⁴ The esophagus is a rare site for melanomatous metastases.¹⁶⁵ Treatment is the same as for any other neoplasm in this region.

Only a few cases of gastric melanoma have been observed.^{166,167} None of these have been proved to be primary. Though admittedly rare, patients with suspicious looking melanotic skin lesions and gastrointestinal symptoms should be investigated for possible neoplasia in this site.

The gallbladder can be considered in this category as it is embryologically related to endodermal tissue. There are only 5 documented

cases of melanoma of the gallbladder.¹⁶⁸ The possibility of a primary lesion arising in this site has provoked further histogenic debate. The proponents of a neural crest origin of the melanocyte believe that the immature melanocyte, or melanoblast, may migrate anywhere in the embryo and, thus, become potential primary malignancies. Others feel that cellular metaplasia in situ provides the explanation. Whatever the answer, one must be cautious in designating melanomas in these rare sites as primary lesions.

A considerable number of cases of secondary intestinal melanomatosis are found in the literature.¹⁶⁹⁻¹⁷¹ Primary lesions were reported as such because, upon careful examination, no other primary melanoma or suspicious nevus was uncovered. Until the origin of the melanocyte in man is definitely proved, this problem of primary or secondary neoplasia in columnar cell mucosa will never be solved. The majority of melanomas in this site present the symptoms of obstruction and intussusception and are managed surgically.

The most common site of gastrointestinal melanomas is the anorectal region.¹⁷² The squamous epithelium of the anal canal poses less of a histogenic problem than the regions mentioned thus far. A black, ulcerated mass at the anal orifice plus the typical history of anorectal neoplasia usually provide the clinical diagnosis.

Genitourinary tract. Nineteen cases of primary vaginal melanoma have been reported.¹⁷³ Involvement of the cervix, uterus, fallopian tubes, and ovaries has also been described. One hesitates to accept these regions as potential sites for the development of primary melanomas, save the stratified squamous cell-lined vagina. Complete autopsies, seeking other more likely sites for primary lesions, are not always performed. The gynecologist diagnoses and manages these lesions in a fashion similar to that of other neoplasms in these regions.¹⁷⁶

Primary malignancies of the female urethra have been seen occasionally.¹⁷⁷ As with vaginal involvement, this observation is more credulous to the author, since this area is lined by epidermal-like epithelium. Early diagnosis with rapid treatment of focal disease can alter an ordinarily poor prognosis. The dismal outlook in many of these perineal malignancies in women is attributed to late symptoms and diagnosis accompanied by early metastasis.

The distal urinary tract of the male is less often involved.¹⁷⁸ The glans penis,¹⁷⁹ urethra, and prostate¹⁸⁰ all have been observed to bear melanomatous foci.

Adrenal gland. Although quite rare, adrenal melanomas are very interesting because of the

theoretic support they contribute to those who maintain that melanocytes are derived from neural crest tissue.^{181,182} The neural crest origin of the adrenal medulla is well accepted. Also, the chemical similarity between epinephrine and tyrosine promotes further speculation along biochemical lines.

Heart. The melanoma is one of the neoplasms that most frequently metastasize to the heart.¹⁸³ Such an occurrence usually accompanies widespread metastases. The suggestive symptoms include dyspnea, tachycardia, arrhythmias, and effusion.^{184,185} This, of course, holds true for cardiac metastases of all origins. Serial electrocardiographic tracings provide a presumptive diagnosis in over 25 per cent of these patients. These tracings may exhibit T wave abnormalities, low voltage complexes, and ST segment deviations. In a few cases, roentgen examination may be of assistance as well as cytologic studies of pericardial fluid.

Other sites. Osseous metastases have been said to occur in 4 to 10 per cent of cases.¹⁸⁶ This fact may be of diagnostic import as will be mentioned. The breasts, liver, and lungs have also been implicated in metastatic processes.

DIAGNOSIS AND TREATMENT

Having considered the diagnosis and treatment of the systemic varieties of melanomatosis, it is only fitting that an entire section of this paper be devoted to the diagnostic and therapeutic problems attendant to the most common site of this neoplasm, the skin.

Diagnosis of epidermal melanoma. Studious clinical evaluation of a suspicious skin lesion should be achieved before a biopsy specimen is sent to the dermatopathologist. Because of the multiple variants and exceptions in skin histopathology, clinical impressions are essential.¹⁸⁷

Grossly, the melanoma must be differentiated from pigmented nevi, seborrheic and senile keratosis, subepidermal fibromas, hemorrhagic sarcomas, hematomas, warts, and pigmented basal cell epitheliomas.³⁷ The melanin found in many basal cell carcinomas may be an indication of the veracity of Bloch's theory.

Clinical manifestations of malignancy include darkening, increase in size, thickness and elevation, crusting, ulceration, bleeding, diffusion of pigment into surrounding skin, satellitosis about the large primary lesion, and, finally, evidence of near or distant metastases. These clinical signs portray the evolution of a junctional nevus into a malignant melanoma and should be carefully examined.

In addition to the usual histologic criteria for

malignancy, the microscopist should look for an increase in melanin pigment, plasma and lymphocytic cell infiltrate in the corium, and dysjunction of the neoplastic cells from the epidermis into the dermis.¹⁸⁸

Special diagnostic procedures have been utilized, particularly to differentiate amelanotic melanomas from other less malignant nonpigmented lesions. Fitzpatrick⁹⁹ has popularized the histochemical technic of incubating tyrosine with biopsy specimens from a suspicious lesion. The activated tyrosinase enzyme system of amelanotic and melanotic melanomas catalyzes the oxidation of the exogenous tyrosine into melanin, coloring the tissue black.

The field of radioactive isotopes has found a niche in melanoma studies. Several workers have investigated melanoma metabolism by using tyrosine labeled with radioactive carbon.^{189,190} Melanomatous tissue, when incubated with radioactive tyrosine, exhibits Geiger counter readings of much greater magnitude than benign junctional nevi.¹⁹¹ That which has occurred is the transformation of radioactive tyrosine into radioactive melanin. Additional research has indicated the presence of an antienzyme factor in the serum of melanoma patients which is twice that of normal subjects.¹⁹² The research and therapeutic potential inherent in these particular studies is vast but, as yet, not fully explored. Experiments with isotopes of iodine, phosphorus, and copper have been done in animals and man, but the early studies revealed no selective uptake of these compounds by the melanoma tissue.¹⁹³ Recent investigation with P³² revealed significant differences in radioactive response between malignant melanomas and benign nevi, enabling accurate diagnosis of the few cases studied.¹⁹⁴

Since osseous metastases are more common in melanomatous disease than once believed,¹⁹⁵ bone marrow aspirations have become a useful tool in difficult diagnostic problems. The observation of malignant cells in the marrow has averted more than one mutilating surgical procedure intended to stem the tide of supposed localized primary disease. Needle biopsies are done at sites of maximum skeletal tenderness.

No melanoma work-up is complete without observing the color of the urine. Quite often, in hematogenous dissemination of metastatic cells and tyrosine degradation products, the urine turns a very dark shade of brown. Due to an excess of the renal threshold, the colorless, water soluble melanogens are oxidized, upon standing, to a dark melanin precipitate.¹⁹⁶ The Thor-mählen test is specific for urinary melanogens.

In this test, a few drops of dilute sodium nitroprusside are added to 5 cc. of urine; then, upon adding a few drops of 10 per cent NaOH solution, the sample turns a deep ruby red color. This color is positive for acetone and creatinine as well. However, by acidifying the solution with glacial acetic acid, the color suddenly turns from ruby red to an azure blue. The latter shade is positive for melanin only. If the urine contains acetone, the color turns a deeper red, and, if creatinine is present, it turns yellow, then slowly green, and finally blue.

Melanin may also be identified by ferric chloride oxidation of the melanogens.

As mentioned before, the levels of MSH in the urine and blood can be determined by either in vivo or in vitro methods of bioassay.^{85,197}

Treatment of epidermal melanoma. Although the prognosis is generally poor, mortality can be curbed by a thorough work-up, early diagnosis, and adequate treatment. The latter consists of excision; electrical or chemical cautery is almost universally condemned.¹⁹⁸ Suspicious neval lesions should not be merely cut into but completely excised for microscopic study.

Good management does not exclude prophylactic consideration. Macular pigmented nevi in sites of potential trauma are certainly good candidates for removal.¹⁹⁹ Such sites are the hands, feet, genitals, bearded area of the face, and areas of garment pressure, especially in women. Nevi in prepubescent patients and new, rapidly growing lesions in adults should also be considered.

Therapy for the malignant melanoma itself embodies the same foregoing principles. The problem and the solution were well defined at the turn of this century. Handley,²⁰⁰ in 1907, stated that "the problem is not the excision of an organ but the extirpation of a diseased lymphatic area." Pringle²⁰⁰ added, "a radical extirpation of the disease might be most certainly ensured by excision of the tumour, with a good zone of the healthy skin around it, and a somewhat larger zone of the underlying deep fascia up to and including the nearest anatomical group of glands at least; and all that is removed should be in one continuous strip as far as possible." Almost half a century later, essentially the same therapeutic principle is carried out.

With hematogenous dissemination, no surgical intervention is indicated, but, with or without lymphatic spread, the surgeon can elect any of 4 accepted procedures. In Pack and associates²⁵⁸ large series of 1,190 cases, a 37 per cent five-year survival was obtained by merely performing wide local excisions. These cases were diagnosed early and were without known adenopathy. It

should be mentioned, however, that in half of the cases without clinical adenopathy, there is microscopie evidence of metastases.²⁰¹ In cases with regional node involvement, wide local excision plus radical node dissection achieved a 20 per cent salvage rate. With wide excision in continuity with a radical node dissection, results were about the same. The choice between the latter two procedures depends upon the distance between the primary lesion and the pathologic lymphoid tissue. Radical amputation of an involved extremity has been performed in more advanced cases, with a 31 per cent survival reported in Pack's series. Chemosurgery has been used also in dealing with melanomas.²⁰² This procedure ensures complete removal of the primary lesion and has been quite successful. When establishing the efficacy of any of these operations, one must consider the time lapse between the initiation of the disease process, its diagnosis, and its eventual treatment.

Because of the supposed hormonal relationships to melanomatous neoplasia, therapeutic management along these lines has been attempted. Administration of ACTH and cortisone,²⁰³ bilateral adrenalectomy,²⁰⁴ orchidectomy,^{205,206} hypophysectomy,²⁰⁷ and thyroidectomizing doses of I¹³¹²⁰⁸ have effected at best only a temporary feeling of well-being without any true pathologic regression. Wigby and Metz²⁰⁹ reported one case that exhibited remarkable regression after intensive irradiation of the pituitary gland. This patient was free of clinical metastases to regional nodes. Such medical and surgical hormonolysis should not be entirely discarded as a potential therapeutic tool because almost all the patients so treated had far advanced disease. Perhaps earlier intervention would achieve more encouraging results.

Chemotherapeutic agents have had little or no effect on the course of the melanoma. Folic acid

and the purine and pyrimidine base antagonists have been quite unsuccessful.²¹⁰⁻²¹³ The same is true of the oral and intravenous nitrogen mustards.^{214,215} Triethylenephosphoramide (TEPA) has been used fairly extensively but has produced only palliative results.²¹⁶⁻²¹⁹

Monobenzyl ether of hydroquinone (MEH), a successful depigmenting agent which acts by tyrosinase inhibition, has been administered orally to 8 patients without any benefit.²²⁰

An antimelanin gamma globulin has been tried in experimental animals without success.²²¹ Such an attempt at therapy is certainly provocative and may provide an ultimate solution.

Series of rabies vaccine injections have been given to several patients, and subsequent clinical as well as histologic regressions were observed.^{222,223} This virus therapy, so far, seems to be of only temporary value.

Most authorities agree that roentgen therapy has no place in the management of the melanoma. A few have not accepted this dictum and maintain that irradiation has produced a clinical cure. In certain instances in which excision is inconvenient or impossible, such treatment may prove very useful.^{224,225} Radioactive isotopes, such as Cu⁶⁴, I¹³¹, and P³², have been employed, but only the latter has exhibited a differential increase in uptake plus amelioration of the gross and microscopie incidence of progressive neoplasia.^{226,227} Again, the familiar sequence of expectation yielding to frustration appears, as this isotope-induced regression seems to be only short-lived.

CONCLUSION

A most apt conclusion seems to have been supplied by James Ewing, who, more than two decades ago, stated that "the problems of melanoma maintain their position as the most interesting and complex of any department of oncology."

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Notes from a Medical Journey

Tucepi (Makarska), Yugoslavia
11 October 1958

Dear Jay:

Our work in Dalmatia began in confusion because of delay in the arrival of essential equipment, but we soon caught up to the theoretic schedule. Now all goes so smoothly that today I am staying behind in the hotel to do "office" work -- and get an extra swim in the blue Adriatic below my balcony -- while the team examines the last 30 men in the village of Podgora a third of the way up the steep wall of mountain behind me.

Drs. Henry Blackburn and Josef Brozek of Minnesota, Flaminio Fidanza of Naples, and Eric Zetterquist of Stockholm are there with the Yugoslav team -- Dr. Ratko Buzina, who is the general manager; the internists, Drs. Arpad Hahn (professor of medicine at Zagreb), Ivica Mohacek, and Svonimir Grgic; the nutritionist, Dr. E. Ferber; and Dr. Diefenbach, hematologist. Then there are four dietitians plus Miss Pekkarinen from Helsinki, who ran our dietary surveys in Finland two years ago; two medical students, who labor mightily as technicians; and a car driver and handy man. Temporarily, we also have with us two nutritionist-physicians, Drs. Milan Mitrovic of Belgrade and Vera Ragazzi of Ljubljana. Eunice Brozek frequently drives one of the cars over the local goat tracks. Margaret is under far less pressure as laboratory manager and general pinch-hitter than in our previous field operations; she was laid up with pneumonitis for a few days but now seems to be fully mended.

So, we are quite a party when we sit down to dinner each night. This isolated hotel was developed for communist big-wigs, but lately it has been opened to the general public. Tucepi is rather remote for most of the world's tourists, but the magnificent scenery, climate, and bathing would attract them by the thousands if travel here were easier. Boat service from Italy, 150 miles across the Adriatic, is scarcely worth mentioning. By rail, one must start from central Yugoslavia to end 40 miles north at Split, and the roads are unbelievably bad. Now it is the end of the season and we have the place to ourselves save for occasional motorists, mostly Germans, who arrive weary and dust-covered, recuperate for a few days, and

regretfully start back again on the long trek to paved roads and more familiar languages.

Our interest here is in the fact that this is olive oil country, with a stable and extremely cooperative population who get plenty to eat and whose diet is very high in oleic acid but which provides little meat and dairy products, that is to say it is very low in saturated fats. After the work is finished here, the team will move to another part of Yugoslavia where the people and mode of life are much the same except for a diet relatively rich in animal fats. In each area, we have chosen a group of villages to contain about 750 men 40 through 59 years of age, and we hope to examine practically all of these men. I was skeptical whether we could better the record we made last fall on the island of Crete (97 per cent of all men of given age examined in our 13 villages), but so far we are batting 100 per cent and the Yugoslavs insist that this will continue. The population is so stable and cooperative that apparently we can count on a complete follow-up in the years to come. The idea is that the Yugoslav doctors will check the health status of these men yearly, and then, in about five years, we shall repeat the whole business. In the meantime, dietary surveys will be made to cover all of the seasons of the year. We have the same plan in mind for several areas in Finland, where heart disease is very common, as well as in Italy, Greece, Norway, the Netherlands, and Japan. All this is contingent on finding the money to finance these operations on a long-term basis; in each area, there is some local support but a central pool of funds is essential.

On this side of the Adriatic, a wall of jagged stone, a mountain range 3 to over 6,000 ft. high skirts the shore line. The pale gray cliffs seem to plunge straight down into the sea with only a narrow girdle of dark green at the water's edge to break the descent. Actually, the dark green proves to be a strip of pine woods and behind this on slopes reaching up to the foot of the cliffs and extending up ravines to over 1,000 ft. are olive trees, almost as gray in foliage as the rock and stone-terraced vineyards. Here and there, perched on spurs of the slope, are little groups of white houses and above them one can make out a faint lighter-gray line doubling back on itself in ascending zig-zags before disappearing in the shadows of a notch in the ridge far above us. That is a stony track over which one can go by car -- with a strong low gear, stout brakes, and a good head for heights -- to the mountain villages on the other side of the range. The main road to Dubrovnik, 100 miles south, is much the same, high above the sea for the most part, and our survey villages are along this road or not far from it.

All of this sounds as though we are going to a lot of trouble to find difficult terrain, but these geographic features contribute to the stability of the population and their diet. A few of the young men leave to seek their fortunes elsewhere; some of them manage to send home money from Australia or South America, but they seldom return and, beyond the age of 30 or so, the people stay put. We find them universally kind and cooperative, less exuberantly gay than the Italians with whom we have worked so much but hospitable and completely reliable in providing information and keeping appointments. They work hard but one seldom sees extreme physical exer-

tion, and there seems to be plenty of time for sitting around talking and, in the evening, singing. Any small group of men will provide at least a good quartet, even without the spur of alcohol, though this last is apt to be involved too. Alcohol consumption is high and there is plenty of drunkenness, especially on Saturdays and Sundays. The local wine is rough but very cheap and slivovitz (plum brandy) provides the extra "shot in the arm."

Medicine is largely socialized; the doctors have official jobs but can have private consultations in their spare time. Everywhere here, the work day begins at 7 a. m. and ends at 2 p. m., and almost everyone uses the afternoon and evening to supplement the income. Farmers, however, mostly work on their own and are no longer "collectivized" in this part of the country. Much of their produce they sell directly to the consumer in the local markets, and there is a constant stream of horse- and ox-drawn wagons and hand-pulled carts going into the towns in the mornings and back to the farms in the afternoons. Automobiles are so scarce that there is little "discipline" on the roads, so one drives with one hand on the horn and a quick foot on the brake.

But to get back to medicine and the doctors, the average technologic level is kept down by the paucity of modern equipment and the limitations of laboratory training in the schools. Here, of course, we see real rural medicine. When Margaret was ill, Henry Blackburn wanted a good "work-up" -- x-ray, hematology, blood culture, etc. Even though it was Sunday evening and the movies were on, the facilities of Makarska (population 4,000) were quickly put at our service. Dr. Jurela and his staff at the local "health home" rallied 'round; hematology was done without the help of a mechanical stage on the microscope, and the chest film was taken by positioning Margaret in front of the tube and the doctor holding the cassette against her chest with his bare hands while the exposure was made. Of course, all is very different in Zagreb and the other big cities, but, even there, the practice of medicine gets along with much less of the expensive gear which we have become dependent upon at home.

As to the disease picture, it is far too soon for us to say much except that in these villages, as in Crete and southern Italy, it is remarkably hard to find any cases of definite coronary heart disease and all abnormalities in the electrocardiogram seem to be pretty rare. Every man is getting an exercise test, but postexercise ST depression is anything but common. The clinicians are finding it pretty dull, I fear. The monotony of negative findings and normal ECGs is occasionally relieved by a patient who has heard of this work and has traveled from Split or elsewhere to beg for an examination, sometimes with his electrocardiogram in hand. In the villages, we have found some cases of hypertension and several mitrals but no infarcts, no angina pectoris, no bundle-branch block -- this for the first 270 men, average age 50. What surprises me most is the fact we have found no real invalids among the men aged 40 to 60 in these first three villages, the nearest approach being an asthmatic, several moderately severe (but still working) bronchitics, and quite a few residues and mutilations from war injuries.

This region was the site of continued, savage fighting during the war and practically all the men -- and many women -- were either fighting soldiers or at least part-time guerrillas. As a result, many villages lost a fourth of the entire male population, and it is rare to find a family that did not have at least one person killed by the Germans; one of our local colleagues lost five brothers. So, the men we study are what the statisticians would call a "population of selected survivors." Perhaps some of our most indefatigable critics will suggest that the Germans managed to kill all the men who otherwise would have survived to have heart disease now!

This last is the kind of nonsense that provokes Ernest Klepetar, our actuarial colleague from Saint Paul, to his most derisive laughter, but, as he points out, some few but noisy statisticians are capable of just that frenetic interpretation in the effort to deny that there are great differences in the frequency of coronary disease between peoples who subsist differently. Incidentally, the Klepetars, who have been with us for a month, have just left for Austria, but we shall meet them soon again in Italy.

But now the time is short if I am to have my swim. I want to do a deep dive off the little stone pier of the hotel to touch bottom. The water is so clear that I can easily see the occasional sea urchin among the white stones at the bottom, but it must be 15 or 20 ft. down.

All the best,

As ever,

A handwritten signature in cursive script, reading "Ancel Keys". The signature is written in dark ink and is positioned in the lower right quadrant of the page.



James S. McCartney, Jr., M.D.

1893 - 1958

DR. JAMES S. McCARTNEY, JR., died suddenly and unexpectedly in Minneapolis on August 30, 1958. He was born in Tarentum, Pennsylvania, July 21, 1893. After receiving his B.A. degree from Washington and Jefferson College, Washington, Pennsylvania, in 1913, he attended Johns Hopkins University School of Medicine, Baltimore, where he was awarded his M.D. degree in 1917. Following an internship at St. Francis Hospital in Pittsburgh, he was commissioned first lieutenant in the Medical Corps, Field Remount Squadron 317 A.E.F. In November 1919, he went to Rochester, Minnesota, to serve as a fellow in surgery until September 1920, when he accepted an appointment as instructor in pathology at the University of Minnesota. This appointment marked the beginning of thirty years of continuous and devoted service to the Medical School of the University of Minnesota.

Dr. McCartney made many important contributions to medicine in his studies on thrombosis and embolism, dissecting aneurysms of the aorta, and on hepatic diseases, especially cirrhosis. In addition to these research activities, Dr. McCartney was a distinguished teacher. He was never too busy to help students and colleagues, and, because of this unselfish devotion, he was loved and respected by all of those who knew him.

A man of many interests, Dr. McCartney was especially fond of fishing and, in past years, hunting. He was a true fly fisherman who meticulously tied his own trout flies, which he used each summer on his trips to the trout streams of Montana. This past summer he broke tradition and decided to spend the month of August at home with his wife Naomi, his sons, Bill and Jim, and their families.

Dr. McCartney was a member of the American Medical Association, the Minnesota State Medical Association, the Hennepin County Medical Society, the American Association of Pathologists and Bacteriologists, the College of American Pathologists, the International Academy of Pathology, the Minnesota Society of Clinical Pathologists, and the Minneapolis Academy of Medicine. For many years he had served as president of the Minnesota State Board of Examiners in the Basic Sciences and as secretary-treasurer of the Minnesota Pathological Society.

Vacant Sanatorium Beds

AS WE CROSS THE THRESHOLD of a new year, perhaps a recapitulation of where we stand in the control of tuberculosis is in order. We are at a critical point in the historic battle to control the disease.

The battle in this country was begun formally with the formation of the National Association for the Study and Prevention of Tuberculosis in 1904, with Dr. Edward L. Trudeau as one of the organizers. The name is now National Tuberculosis Association. County, district, and state associations are organic members of this national body. Due to the remarkable reduction in death rate from the disease, we have arrived at a crossroad where public apathy and complacency may possibly nullify advances made against the disease. Already, some voices are suggesting that we have reached the desired place in our control program—that efforts directed toward public health programs for tuberculosis can be minimized—and that it is no longer necessary to remain alert to the threat of tuberculosis.

These attitudes present an immediate problem of great urgency to those interested in maintaining effective controls on one of mankind's greatest blights. The trend toward negative thinking cannot go unchallenged lest the spread of unjustified opinions create havoc with our existing tuberculosis control measures—measures which have proved their worth in holding the line against the disease.

Progress has been made in easing the national tuberculosis problem. We call attention with pride to the fact that improved tuberculosis drugs, surgical procedures, and methods of management have collaborated to reduce tuberculosis deaths to an all-time low, while effecting a reduction in the length of hospitalization by one-half during the past decade.

This reduction in the time necessary for sanatorium treatment is the reason for the empty beds. The incidence of the disease remains virtually unchanged. Spreaders of the disease remain unknown and at large in the community. Surveys are the only effective means of finding unsuspected cases.

Despite the progress made in treatment, tuberculosis claimed the lives of more than 14,000 Americans in 1956. In the same year, 3,000 persons died of the disease whose cases had not previously been reported to health officials.

The progress made in the treatment overshadows any similar progress made in reducing the community-wide tuberculosis problem. New cases of disease continue to be reported at a higher rate than

deaths. In 1956, 69,000 new cases of active and probably active tuberculosis were reported. The new active case rate for that year was 5 times greater than the death rate.

The dollar sign gives some indication of the extent of the current problem. Estimates of the National Tuberculosis Association place the cost of tuberculosis to taxpayers in excess of \$725,000,000 in 1956. Hidden costs, such as loss of earnings, are not included. Needless to say, for a disease that is preventable, this is a shameful waste of our resources.

A successful tuberculosis treatment program, together with the number of new cases which continue to be reported, is responsible for a relatively new development in our tuberculosis picture. Today, more people are living who are known to have or to have had tuberculosis and a greater number of people are currently receiving some supervision for their disease than ever before.

In Hennepin County, as perhaps elsewhere, the changing tuberculosis picture is reflected at Glen Lake Sanatorium by its vacant beds. Despite the highly publicized and misinterpreted vacant bed situation, the number of admissions to the sanatorium has not changed significantly in the past decade. In 1948, there were 436 admissions as compared to 426 admissions in 1957. The intervening years present the same picture. Vacant beds alone should not dominate our appraisal of the present tuberculosis problem.

Certain needs are indicated if desired progress in the control of tuberculosis is to continue here. These needs include a keen analysis of our present problem to determine its extent and our probable future course of action; a tuberculosis-directed institution, such as Glen Lake Sanatorium, which would continue to provide leadership in the care and treatment of the disease and be a focal point for tuberculosis prevention and control activities; and a public education program to interpret current problem needs.

In planning the use of vacant beds now available, no plans should be adopted that would diminish in any way the primacy and effectiveness of the Sanatorium in the care and treatment of tuberculosis.

We have not arrived at the desired place in control. We are performing the best job possible with the tools available. As long as we continue to apply our proved tuberculosis control techniques and remain alert to the disease, progress toward reaching our objectives in tuberculosis control will continue.

Practical Gynecology, by WALTER J. REICH, M.D., and MITCHELL J. NECHTOW, M.D., 1957. Philadelphia: J. B. Lippincott Co., 648 pages. \$12.50.

This book was written principally for the general practitioner to use as a guide in diagnosis and treatment of office gynecologic problems. In this regard, it fulfills its obligations both in span and in the practical handling of common minor problems.

As a reference book for the specialist or as a textbook for students, however, the book is wholly inadequate. The therapy outlined for a number of major gynecologic diseases is controversial, such as x-ray treatment for carcinoma of the vulva.

The book is attractively printed. Excellent plates and many brief case histories are included which make interesting reading.

The volume is recommended for limited use in everyday office practice.

ERNEST W. LOWE, M.D.

•
The Practice of Nuclear Medicine, by WILLIAM H. BLAHD, M.D., FRANZ K. BAUER, M.D., and BENEDICT CASSEN, Ph.D., 1958. Springfield, Illinois: Charles C Thomas, 407 pages. \$12.50.

This book is an especially timely presentation in the light of advancements in medical knowledge made possible in the past two decades by the use of radioisotopes. This book is intended for physicians who are primarily interested in the clinical aspects of this subject. Although some reference is made to tracer methods in research, this subject is outside the scope of the book. Within this intended framework, the authors have presented a comprehensive yet nonmathematical treatment of accepted medical diagnostic and therapeutic methods employing radioisotopes.

The reader will find in the early chapters a clear and concise presentation of physical principles of nuclear medicine. Although much more could be included on this subject, the authors have chosen to limit this treatment to essential topics which the uninitiated must understand in order to satisfactorily employ nuclear radiations in medical practice. Throughout the book, photographs and illustrations are of great assistance in the understanding and performance of clinical laboratory procedures employing radioactivity. The

BOOK REVIEWS

chapters in which these methods are presented are especially well written. Sufficient detail is included along with adequate references to pertinent contributions by various investigators to permit satisfactory reproduction of the various techniques. The authors comment realistically on the merits and limitations of various applications of radioisotopes, including their value in tests of thyroid, gastrointestinal, and cardiovascular function and in hematology, tumor detection, and therapy.

In the latter chapters, special reference is made to instrumentation, procurement of isotopes and design of an isotope laboratory. This information is of special value to the physician who is planning to establish a practice in nuclear medicine.

MERLE K. LOKEN, Ph.D.

•
Breast Cancer, edited by ALBERT SEGALOFF, M.D., 1958. St. Louis: C. V. Mosby Co., 257 pages. \$5.00.

In January 1958, the second biennial Louisiana Cancer Conference, sponsored by the American Cancer Society, was held in New Orleans. The subject of the conference was "Breast Cancer." The participants were distinguished and able representatives of many medical disciplines. Included were well known pathologists, surgeons, and physicians as well as representatives of the fields of endocrinology, radiology, epidemiology, biochemistry, zoology, virology, and psychiatry.

The papers given at the conference were divided into four main general categories: I. Basic Biology (Treatment of Breast Cancer in general), II. Definitive Treatment, III. Basic Biology (in regard to hormonal therapy), and IV. Hormonal Therapy. Everything is included in these categories—epidemiology of the disease, pathology, cytology, "milk agent," and care of terminal patients. All treatments are covered thoroughly and definitively by outstanding exponents of each particu-

lar type of therapy—radical surgery; extended radical surgery; radiation therapy of all types, including pre-operative, limited surgery plus radiation, and radiation for palliation of advanced cases; and all types of hormonal therapy, both medicinal and ablative. Following each general category of papers is a panel discussion, each of which is stimulating and provocative. These are at least as valuable, if not more so, than the more formal presentations.

The reviewer has found this book to be a superb accumulation of nearly all the information in the literature today regarding breast cancer. Each school of thought is well and vigorously presented, frequently by the foremost exponent of each in this country. A surgeon who wants an authoritative and well organized presentation of such matters would do well to read and reread this excellent book.

JOHN H. ROSENOW, M.D.

•
De Mortu Cordis, by WILLIAM HARVEY, physician to the King and professor of anatomy in the College of Physicians of London, 1628. Translated from the original Latin by Kenneth J. Franklin and now published for the Royal College of Physicians of London, 209 pages. \$3.50.

The interested physician will owe a debt of gratitude to this translator who has aimed to get nearer to Harvey's precise thought in his great work of 1628. The attempt has been to discover more accurately what Harvey intended to convey by every Latin sentence that he included. This volume contains the Latin text, a reproduction of original figures, and a photograph of Harvey and would grace the bookshelves of any physician with the urge to delve into the text and to get glimpses of the anatomic and physiologic observations of a master mind, a pioneer in animal experimentation and clinical evaluation of the circulation.

C. A. MCKINLAY, M.D.

•
A System of Ophthalmic Illustration, by PETER HANSELL, M.R.C.S., F.R.P.S., F.B.P.A., 1957. Springfield, Illinois: Charles C Thomas, 109 pages. \$5.75.

This book is written not by a physician but by a professional medical photographer, who is well versed in his field and knows a great deal
(Continued on page 24A)

*When it comes to colds and coughs,
surgeons are just like their patients
... they want relief of symptoms and,
if possible, to stay on the job.*

Romilar Cold Formula controls the
entire symptomatology of colds,
including coughs. A synergistic
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controls fever and malaise*

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syrup, or each capsule, contains: 15 mg Romilar
HBr (non-narcotic antitussive); 1.25 mg Chlor-
pheniramine maleate (antihistamine); 5 mg Phenyl-
ephine HCl (decongestant); 120 mg N-acetyl-
p-aminophenol (analgesic-antipyretic).

*L. O. Randall and J. Selitto, *J. Am. Pharm. Assn. (Sc. Ed.)*, 47:313, 1958.
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BOOK REVIEWS

(Continued from page 88)

about photography. In fact, he is so well versed that he admits that photography has its shortcomings and that it will never replace the artist. This is an admission seldom made by amateurs or professionals under any circumstances. The author's general attitude is best summed up in a part taken from the Foreword:

"This monograph must necessarily be concerned with photography in the main, but the camera cannot stand alone; in eye work there are too many features demanding illustration which cannot conveniently be photographed. As progress removes these technical barriers, however, many such records remain unsatisfactory. A photograph taken in an instant of time cannot convey the three-dimensional synthesis of human comprehension. It is in these realms that the artist reigns supreme; in techniques such as biomicroscopy of the eye, the observer sees a constantly moving image, he scans an area and thus builds up a concept of the whole—only the artist can convey this impression in his finished drawing. It is true that a photograph may be used to sup-

plement the artist's work for the sake of scientific accuracy, or that the artist may work from photographs on occasion, but essentially the two remain distinct."

The book contains 9 chapters, an appendix, and an index. The chapters are as follows: I. The Patient, II. Anatomical Considerations, III. Equipment and Materials, IV. Working Technique in Studio, Ward, Operating Theatre and Consulting Room, V. Motion Picture Photography, VI. Special Techniques, VII. Photography of Gross Specimens and Special Preparations, VIII. The Ophthalmic Artist, and IX. Documentation and Records.

This monograph is printed on smooth paper and is profusely illustrated. The illustrations are, in the main, black and white photographs exquisitely done and beautifully reproduced. There are many tables, reproduced x-ray films, black and white drawings, a few full color photographs, and a few three color illustrations.

The text discusses all sorts of photography about the head, with emphasis on the eye. The use of many types of equipment are discussed, primarily the larger type of equipment used in clinics and hospitals.

However, the needs, simplified and yet adequate, for the man in private practice are well considered, and, in these reviewers' opinion, well recommended. The photography of pathologic specimens is well given. The appendix contains an interesting statistical analysis of photographs about the head and neck. According to the author's figures, 42 per cent of such photographs are of the eye.

After reviewing this book, we believe that Mr. Peter Hansell is a remarkably fine professional photographer, who has written a monograph of interest to anyone inclined to take pictures, whether he be a professional, amateur, or a physician who wants to do his own clinical photography. In a field full of all kinds of information about what to buy, what to take pictures of, and how, this monograph stands out clear and concise and certainly should be consulted before a physician invests in equipment for clinical photography. This book should belong in the library of anyone who is interested in medical illustrations about the head and, particularly, about the eyes.

FRANCIS M. WALSH, M.D., and
LEON D. HARRIS, M.D.



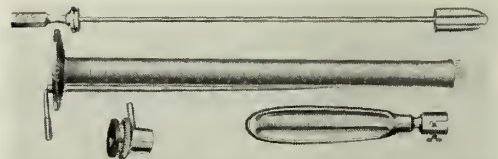
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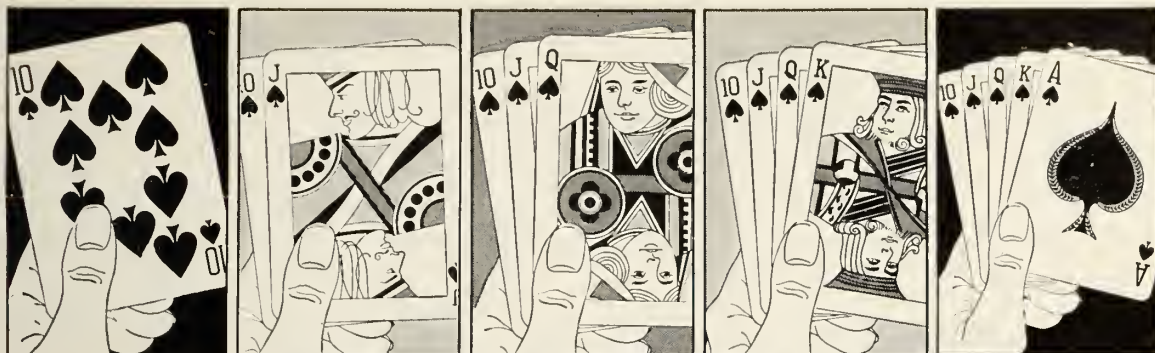
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- relieves cough and related symptoms in 15-20 minutes
- effective for 6 hours or longer • promotes expectoration
- rarely constipates • cherry-flavored

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Hycodan[®]

Dihydrocodeinone Bitartrate	5 mg.	} 6.5 mg.
(Warning: May be habit-forming)		
Homatropine Methylbromide	1.5 mg.	

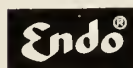
Pyrilamine Maleate 12.5 mg.

Ammonium Chloride 60 mg.

Sodium Citrate 85 mg.

Adult Dosage: one teaspoonful q. 6 h. May be habit-forming.

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News Briefs . . .

North Dakota

DR. D. G. JAEHNING, Wahpeton, was elected president of the North Dakota Chapter of the American Academy of General Practice when the group met at the University of North Dakota in November. Other officers are: Dr. William Buckingham, Elgin, vice president; Dr. R. D. Nierling, Jamestown, re-elected secretary; and Dr. L. T. Longmire, Devils Lake, and H. C. Larsen, Dickinson, members of the board of directors.

• • • •

DR. JOHAN A. ERIKSEN, radiologist at the Quain and Ramstad Clinic in Bismarck, has been certified by the American Board of Radiology. Dr. Eriksen, who is also on the staffs of St. Alexius and Bismarck hospitals, came from Oslo, Norway, and joined the clinic in 1952. He maintains his membership as a diplomate of the Norwegian Board of Radiology and the Norwegian Board of Chest Diseases.

• • • •

DR. O. VICTOR LINDELOW, a partner in the Missouri Valley Clinic in Bismarck, has been notified of his election as an associate of the American College of Physicians. Certified previously by the American Board of Internal Medicine, Dr. Lindelow is now a diplomate of that group.

• • • •

DR. R. DOUGLAS DOSS, former assistant chief of radiology at Veterans Administration Hospital in Pittsburgh, has established practice in Grand Forks. In addition to the post he held at Veterans Hospital, Dr. Doss was also an instructor in clinical radiology at the University of Pittsburgh. He is certified by the American Board of Radiology and is a member of the American College of Radiology. Dr. Doss received awards for scientific exhibits at the 1957 and 1958 meeting of the Pennsylvania Radiological Society.

• • • •

DR. SOHAN L. SHARMA, a native of India, is a recent addition to the psychological staff of the State Hospital in Jamestown. He received his B.A. degree from the University of Punjab, India, and his doctor's degree in psychology from the University of Michigan Medical School. Prior to his present position, Dr. Sharma was staff psychologist at Topeka (Kansas) State Hospital.

• • • •

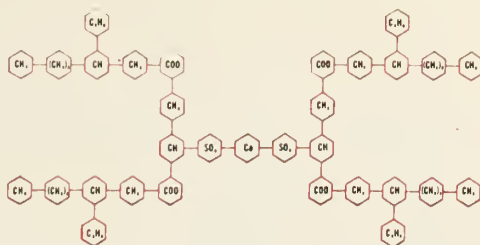
DR. L. H. LANDRY has retired after more than fifty years of practice in Walhalla. He has been a member of St. Mary's Hospital staff at Langdon since it was founded. For several years, Dr. Landry was Pembina County health officer and county coroner. He has also served on the state board of health. In addition to his busy life as a physician, Dr. Landry has been an active participant in civic affairs.

Minnesota

DR. FRANK H. KRUSEN, senior consultant and former head of the Section of Physical Medicine and Rehabilitation at the Mayo Clinic, received a special citation

(Continued on page 28A)

NEW THERAPEUTIC CHEMICAL IN CONSTIPATION



Calcium Bis-(Dioctyl Sulfosuccinate)

The discovery by Wilson and Dickinson¹ at the University of Michigan that dioctyl sodium sulfosuccinate could correct constipation through fecal softening action marked a real advance in therapy. In cases of unimpaired bowel motility this new physico-chemical principle presented a new means of correcting bowel dysfunction without the need of catharsis.

Continuing research has now led to the development of a new therapeutic surfactant with more than double the surfactant effectiveness of the original dioctyl sodium sulfosuccinate.

This new substance, calcium bis-(dioctyl sulfosuccinate), reduces interfacial tension to a minimal value at a concentration of only 0.035 per cent. A minimal value of this order in dynes per centimeter requires 0.1 per cent or more of the older dioctyl sodium sulfosuccinate.

INTERFACIAL TENSION (Oil-Water Interface) <i>Calcium Bis-(Dioctyl Sulfosuccinate)</i>	
Dynes/cm.	Concentration
55.0	0.00%
13.3	0.01%
9.9	0.02%
8.4	0.03%
7.4	0.035%

Improved homogenization of the immiscible lipoid and aqueous phases of the intestinal content depends upon maximum reduction of interfacial tension. The greatest degree of fecal softening is achieved with surfactant agents capable of reducing interfacial tension to minimal values. Calcium bis-(dioctyl sulfosuccinate) represents a markedly more effective surfactant agent since maximum surfactancy results from less than half the concentration of previously used surfactants.

DOSAGE:

DOXICAL 240 mg. SOFT GELATIN CAPSULES—for adults, one daily.

DOXICAL 50 mg. SOFT GELATIN CAPSULES—for children and adults with minimum needs, one to three daily.

1. Wilson, J. L., and Dickinson, D. G.: J.A.M.A. 158:261-263 (May 28) 1955.

This new chemical, definitely superior in surfactant action, is indicated in the treatment of chronic constipation where non-laxative fecal softening therapy is the preferred regimen.

The usual adult dose is 240 mg. daily. For children and adults with minimum needs, 50 to 150 mg. daily may be given.

DOXICAL

LLOYD BROTHERS, INC.

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NEWS BRIEFS

(Continued from page 26A)

from Governor Orville L. Freeman for meritorious service to the citizens of Minnesota and to the nation. The award was made at the dinner of the House of Delegates of the American Medical Association during its clinical session in Minneapolis in December. The citation points out that Dr. Krusen has devoted his life to the service of mankind through his work in physical medicine and rehabilitation and has substantially contributed to the advance of medical knowledge in these fields.

• • • •

DR. WINCHELL MCK. CRAIG, who recently returned from a global trip as a lecturer for the International College of Surgeons, left late in December for Cairo, Egypt, by way of London and Naples. Dr. Craig made the trip as a member of an official delegation named to represent the United States Navy at the tenth anniversary celebration of the founding of the Naval Medical Research Unit in Cairo. Dr. Craig is emeritus head of the Section of Neurologic Surgery in the Mayo Clinic and emeritus professor of neurologic surgery in the Mayo Foundation.

• • • •

DR. JAMES T. PRIESTLEY, head of a section of surgery at the Mayo Clinic and chairman of its board of governors and professor of surgery in the Mayo Foundation, has been elected president of the Western Surgical Association. The election took place at the organization's meeting in Rochester in November.

• • • •

DR. HENRY W. WOLTMAN, former head of the Section of Psychiatry and Neurology at the Mayo Clinic, has been elected chairman of the Olmsted County Mental Health Advisory Board. Dr. R. L. Faucett, Rochester, was named vice chairman; and Robert J. Knox, Oronoco, is secretary. The board supervises activities of the counseling clinic at Rochester-Olmstead County Public Health Center.

• • • •

DR. GORDON KAMMAN is the new president of the Ramsey Medical Society. Other officers are: Dr. E. V. Kenefick, vice president; Dr. Walter Gardner, president-elect; and Dr. Abbott Skinner, secretary-treasurer. All of the men are residents of St. Paul.

• • • •

DR. FRANK J. ANKNER has been elected chief of staff of Glenwood Hills Hospital, Minneapolis. Dr. William R. Fifer was elected vice chief of staff, and Dr. John J. Regan was elected secretary-treasurer. Other medical officers include: Dr. Leonard A. Lang, chief of obstetrics; Dr. Robert W. Cranston, chief of psychiatry; Dr. Frederick M. Hase, chief of general practice; Dr. John W. Labree, chief of internal medicine; and Dr. Ankner, chief of surgery.

• • • •

DR. ROBERT J. HAVEL is the new chief of staff of North Memorial Hospital, Robbinsdale. Other officers include: Dr. Harry St. Cyr, chief-of-staff-elect; Dr. Robert Kohlase, secretary-treasurer; Dr. William Card, chief of surgery; Dr. Samuel Solhaug, Jr., chief of obstetrics; Dr. Roger Lienke, chief of pediatrics; Dr. Frank Martin, chief of medicine; Dr. Robert Meyer, chief of general practice; Dr. Gerald K. Palmer, chief of pathology; and Dr. Richard Tucker, chief of radiology.

DR. HAROLD S. TRUENIAN has been elected president of the staff of Northwestern Hospital, Minneapolis. Dr. Albert J. Schroeder is vice president, and Dr. Mark C. L. Hanson is secretary-treasurer.

• • • •

DR. RAYMOND D. PRUITT, consultant in medicine at the Mayo Clinic and professor of medicine in the Mayo Foundation, has been appointed secretary of the Minnesota Rhodes Scholarship Selection Committee. The committee will interview Minnesota candidates for Rhodes scholarships.

• • • •

THE THIRD AND FINAL VOLUME of "Anatomy for Surgeons" by W. Henry Hollinshead was recently published by Paul B. Hoeber, Inc., New York City. Dr. Hollinshead is professor of anatomy in the Mayo Foundation and head of the Section of Anatomy at the Mayo Clinic. Volume I dealt with the head and neck. Volume II covered the thorax, abdomen, and pelvis. The current volume presents the anatomy of the limbs and back.

• • • •

DR. GERALD E. CHURCH is the most recent addition to the staff of the Community Health Center at Two Harbors. There are now 6 physicians on the staff. A graduate of the University of Michigan Medical School, Dr. Church practiced for three years at a small hospital in Puerto Rico. Prior to joining the staff at Two Harbors, he took special training at St. Mary's Hospital in Duluth.

• • • •

DR. K. W. COVEY, who practiced in Mahanomen for eleven years, recently became associated with the Northwestern Clinic in Crookston. Dr. Covey completed a three-year residency in orthopedics at the Mayo Clinic in December and is in orthopedic surgery at the clinic.

• • • •

DR. MORTON ROAN, former Lamberton physician, has established practice in Ellendale. Residents of the community are now endeavoring to raise sufficient funds to build a clinic.

South Dakota

OPEN HOUSE, sponsored by the Wakonda Commercial Club, was held recently at the new Faithe Clinic in Wakonda. Coffee and doughnuts were served to visitors who had an opportunity to inspect the clinic and its new equipment. Dr. Margaret Faithe operates the clinic, which was designed by her husband, Matthew Faithe. In addition to the reception room and business office, the facilities include a physiotherapy section, recovery room, x-ray and dark room, and two treatment rooms. A children's playground is nearing completion. The Faithe's living quarters in the rear of the building.

• • • •

DR. ROBERT A. NELSON has joined the Department of Medicine at the Bartron Clinic in Watertown. A graduate of the University of Illinois Medical School, Dr. Nelson interned at West Suburban Hospital and served his residency at Hines Veteran's Hospital. During World War II, he served as a pilot in the United States Navy. For the past two years, Dr. Nelson has been engaged in private practice in Kearney, Nebraska.

(Continued on page 30A)



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2. Most consistently elevated serum levels
3. Safe, physiologic potentiation
(with a natural human metabolite)

Proven in practice

4. More rapid clinical response
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PEDIATRIC DROPS



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*TRADEMARK

Deaths . . .

DR. JOHN G. ARNEBERG, 84, a prominent physician in Grand Forks, North Dakota, until his retirement in 1930, died December 17. Although long retired, Dr. Arneberg retained a lively interest in his fellow man and the University of North Dakota. Last year he created a trust to encourage and improve education in foreign languages at the University. In 1956, Dr. Arneberg was awarded the St. Olav Medal by King Haakon VII of Norway for his contribution to closer cultural relations between his native Norway and his adopted country.

• • • •

DR. OTTO A. GROEBNER, 65, a physician in Sioux Falls, South Dakota, from 1917 until his retirement in 1945, died of a heart attack December 21. In World War I, Dr. Groebner was a battalion surgeon in the 90th Division. He had been a member of the staffs of Sioux Valley and McKennan hospitals in Sioux Falls.

• • • •

DR. FRANK R. HIRSHFIELD, 64, St. Louis Park physician and surgeon, died December 16. A lifelong resident of the Minneapolis area, Dr. Hirshfield was a staff member of St. Mary's and Doctors Memorial hospitals in Minneapolis. His numerous affiliations with medical organizations included membership in Phi Beta Pi, honorary medical fraternity, and the American College of Surgeons.

DR. HOWARD B. HUNTLEY, 82, who served the communities of Kindred and Leonard, North Dakota, for nearly fifty years, died December 2. In 1949, Leonard residents honored Dr. Huntley at a recognition day. He was honored twice during 1958, the first time in Minot and the second time during the fiftieth reunion of his graduating class at Northwestern University, Evanston, Illinois.

• • • •

DR. FRANK LAWLER, 68, a member of the medical and surgical staffs of Veterans Administration Hospital, Minneapolis, for more than thirty-five years, died December 4. Dr. Lawler had retired from the hospital two years ago.

• • • •

DR. WALTER F. MUIR, 50, a physician in Browns Valley, Minnesota, since 1946, died December 12 of a heart condition. During World War II, Dr. Muir served with the Army Medical Corps.

• • • •

DR. EDWIN J. SIMONS, 62, executive director of Minnesota Blue Shield and one of its founders, died December 11 at his home in Edina, suburb of Minneapolis. Dr. Simons practiced in Swanville, Minnesota, for twenty-five years. While there, he served for six years as chief of the medical services unit of the Minnesota Division of Social Welfare. Dr. Simons was a past president of the Minnesota Medical Association and a fellow in the American College of Physicians.

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STARTING DATES — EARLY 1959

SURGERY—

- Surgical Technic, Two Weeks, March 2, March 16
- Surgery of the Colon and Rectum, One Week, March 2, April 6
- Basic Principles in General Surgery, Two Weeks, April 13
- Gallbladder Surgery, Three Days, April 6
- Surgery of Hernia, Three Days, April 9
- General Surgery, Two Weeks, April 27
- Board of Surgery Review Course, Part II, Two Weeks, May 11
- Fractures and Traumatic Surgery, Two Weeks, April 6
- Treatment of Varicose Veins, Two Days, March 2, April 6

GYNECOLOGY & OBSTETRICS—

- Office and Operative Gynecology, Two Weeks, March 16
- Vaginal Approach to Pelvic Surgery, One Week, March 9
- General & Surgical Obstetrics, Two Weeks, March 30

MEDICINE—

- Electrocardiography, Two-Week Basic Course, March 16
- Gastroscopy & Gastroenterology, Two Weeks, March 2
- American Board Review Course (Part II), to be announced

UROLOGY—

- Two-Week Intensive Course, April 27
- Ten-Day Practical Course in Cystoscopy, by appointment

RADIOLOGY—

- Diagnostic X-Ray, Two Weeks, March 2, April 27
- Clinical Uses of Radioisotopes, Two Weeks, May 4

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COMING in *April*...

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Appearing in the Pain Section is the article "The Shoulder-Hand Syndrome, Syndrome of Barré-Liéou, and Osteoarthritis of the Cervical Spine," by Louis Gayral, M.D., of Toulouse, France, and Eugene Neuwirth, M.D., of Great Neck, New York. According to the authors, the pain and neurotrophic articular changes of the shoulder-hand syndrome may be secondary to a generalized trophic syndrome of cervical sympathetic origin, such as that of Barré-Liéou, and the shoulder-hand syndrome may be the first sign of the posterior cervical sympathetic syndrome.

- "The Cold War" is the provocative title of the article by John F. Briggs, M.D., of St. Paul. In this case, the term refers to that insidious enemy of mankind, tuberculosis. The fight against this disease has been kept a cold war because volunteer health agencies, public health agencies, and lay and professional people have mobilized in the attack against it. Should these deterrent forces be weakened, the cold war would become a hot war. Ultimate victory depends upon completely eradicating tuberculosis, not merely upon its control.

- Sydney Jacobs, M.D., of New Orleans, Louisiana, believes that tuberculosis therapy has failed unless it has been possible to (1) inactivate the disease, (2) prevent the spread of the disease to others, and (3) restore the patient to complete social and economic usefulness. Dr. Jacobs discusses these goals and points out the problems that may arise in attempting to attain them in his article "Objectives in the Treatment of Pulmonary Tuberculosis."

- Data collected from questionnaires sent to United States hospitals and sanatoriums with beds for tuberculous patients are presented by Abraham Gelperin, M.D., of Kansas City, Missouri, in his paper "Management of the Hospitalized Tuberculous Patient Who Leaves Against Medical Advice." The information received revealed lack of organization within some of the institutions and misunderstandings in their relationship with official health agencies. The study suggests the need for each hospital, sanatorium, and local and state health departments to examine individually and together their programs, plans, and attitudes.

Meetings and Announcements

UNIVERSITY OF MINNESOTA
MEDICAL CONTINUATION COURSES

March 14—Trauma for General Physicians

March 16-18—Internal Medicine for Internists

March 30-April 3—Basic Concepts of Water and Electrolyte Balance for General Physicians

April 2-4—Emergency Surgery for General Physicians

April 6-8—Radiology for General Physicians

April 16-18—Allergy for General Physicians and Specialists

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

OB. & GYN. MEETING

The American College of Obstetricians and Gynecologists will hold its annual meeting in Atlantic City, April 6 through 8. In addition to papers presented by leaders in the field, the program will include clinical conferences, panels, and scientific exhibits. For further information, write Mr. Donald F. Richardson, Executive Secretary, American College of Obstetricians and Gynecologists, P.O. Box 749, Chicago 90.

PHYSICIANS AND SURGEONS TO MEET

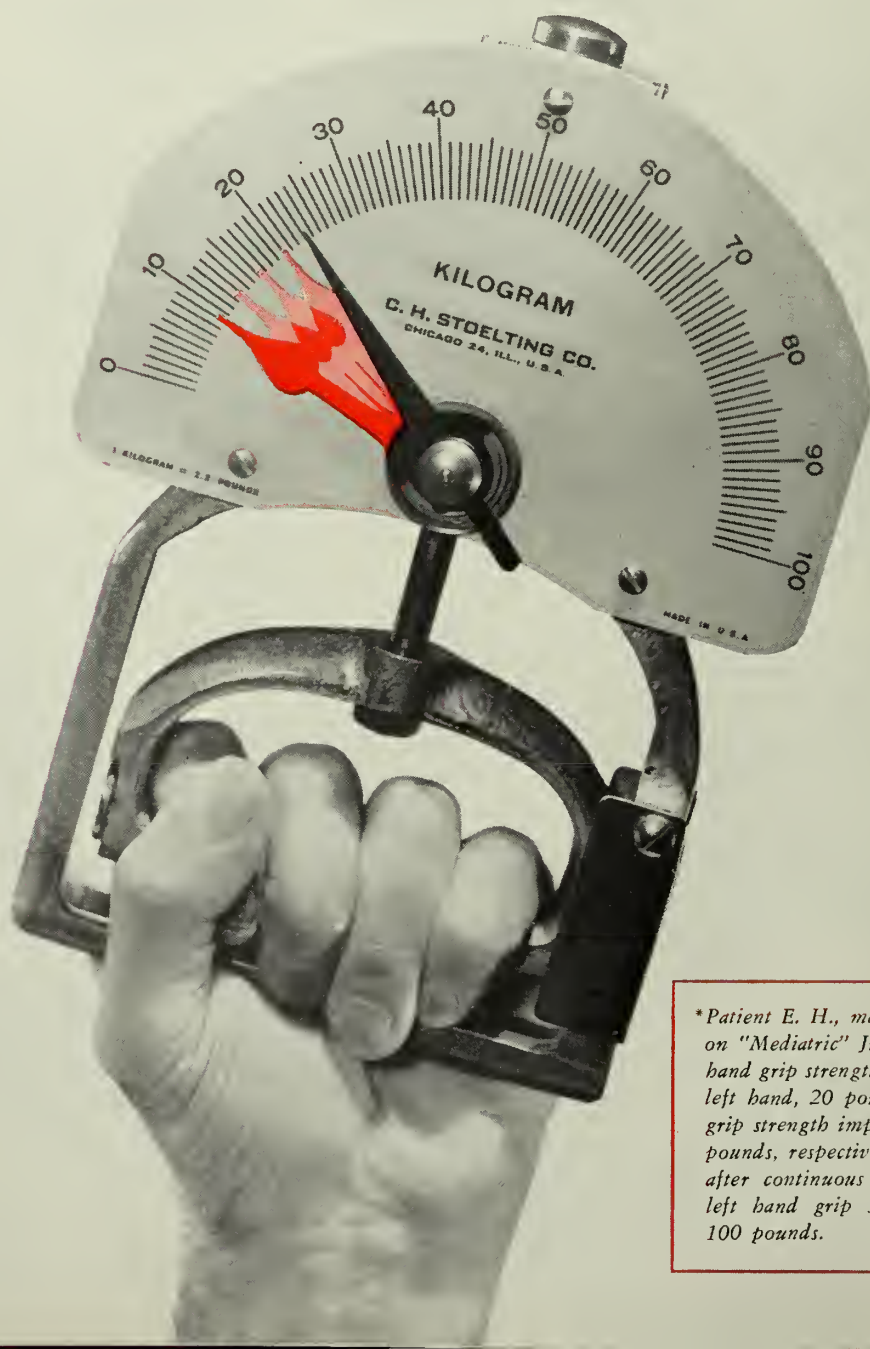
A meeting of the American Association of Physicians and Surgeons will be held in Fort Worth, Texas, April 2 through 4. Additional information may be obtained by writing to Dr. O. W. Johnson, Johnson Clinic, Rugby, North Dakota.

AWARD CONTEST

The American College of Gastroenterology announces establishment of the Henry G. Rudner, Sr., award contest for the best paper on research in gastroenterology or an allied field. The prize will be \$750 plus \$250 for traveling expenses to the group's annual convention. Entries must be typewritten, double-spaced, and submitted by June 1, 1959, to the Research Committee, American College of Gastroenterology, 33 W. 60th St., New York 23.

POSITIVE EVIDENCE THAT "MEDIATRIC" INCREASES MUSCLE STRENGTH

in six weeks' time, left hand grip strength increased
from 20 to 52 pounds—nearly doubled in right hand.*



**Patient E. H., male, age 88, started on "Mediatric" July 24, 1952. Right hand grip strength measured 32 pounds, left hand, 20 pounds. Six weeks later, grip strength improved to 62 and 52 pounds, respectively. On June 29, 1954, after continuous therapy both right and left hand grip strength registered 100 pounds.*

The Journal Lancer

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Adenomas of the Colon and Rectum

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THE EVOLUTION of sound, basic principles concerning the etiology, incidence, pathology, diagnosis, and treatment of intestinal adenomatosis has required many years of work and the study of many men. The first case was described as early as 1721 by Menzel.¹ Some feel that he may have been describing a case of inflammatory pseudopolypoidosis and that Corvisart² was the first to accurately describe this disease entity in 1847.

It was Hauser, in 1895, who presented convincing evidence of the association of adenomatosis with malignancy.¹ The adenoma-cancer relationship, no doubt, has been the single most important stimulus in the development of present-day concepts of diagnosis and treatment of adenomas of the colon and rectum.

Cancer of the colon and rectum ranks next to malignant disease of the stomach. It is estimated that between 30,000 and 40,000 persons die of this disease each year in the United States. In view of our present knowledge, it is generally accepted that benign mucosal adenomas are definitely premalignant lesions.³ Since the ideal approach to the treatment of any disease is prevention, it is appropriate and imperative to stress the early diagnosis and treatment of benign rectal and colonic lesions.

These benign lesions of the rectum and colon are referred to as polyps in most medical litera-

ture, but some² feel that adenoma more accurately describes the lesion.

ETIOLOGY

The precise cause of adenomas of the colon and rectum is not known. The bowel mucosa appears to be predisposed to respond to common stimuli by pronounced hyperplasia. This response may appear as a single adenoma, as multiple adenomatosis, or as carcinoma.² Multiple adenomatosis, although inherited, does not usually manifest itself until childhood or early adult life.¹ It affects males and females equally, and either may transmit the disease. It differs from most hereditary diseases, such as hemophilia, albinism, deaf mutism, and so forth, in that children are not born with it but the condition tends to develop about the time of puberty.⁵ It has not been reported as occurring or being present in the newborn.⁶

Adenomatous formations, whether single or multiple, seem to arise from a predisposed mucosa. It is probable, then, that all adenomatous formations are the result of the same disease. Single adenomas are generally less aggressive than multiple adenomatosis, and the diffuse mendelian dominant type is far more prone to malignant degeneration than the disseminated type.² Cytoplasmic masses resembling inclusion bodies have been reported in the cells of human rectal adenomas.⁷ These intracellular bodies resemble some viral inclusions, thus suggesting a virus as the etiology. Hormonal disorders, nerv-

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ous mechanisms, and allergies have also been suggested, but heredity seems to be the most probable etiologic factor to date.

CLASSIFICATION

A number of different methods of classifying benign rectal or colonic neoplasms have been proposed. The following is based on the tissue of origin:⁶

Mesenchymal—(constitute 5 per cent of polypoid lesions of the colon and rectum)

- Fibromas
- Lipomas
- Leiomyomas
- Lymphomas
- Angiomas

Epithelial—(constitute 95 per cent of adenomas of the colon and rectum)

Adenoma—(true adenoma, adenomatous polyp)

- Single
- Multiple
- Diffuse—(polyposis coli, familial polyposis)
- Inflammatory polyp—(inflammatory hyperplasia, pseudopolyposis)

Bacon and associates² have modified the classification of Rachet, Bousson, and Arnous into the following:

1. Single adenomas
2. Disseminated adenomatosis (segmental or total)
3. Diffuse hereditary adenomatosis
4. Inflammatory pseudoadenomatosis

This classification is based for the most part on the numerical and etiologic occurrence of the adenomas.

Another classification which combines these features and the gross pathologic features of the lesion is as follows:⁷

1. Single or multiple (scattered)
 - Acquired
 - Familial
2. Pedunculated or sessile
3. Smooth or villous
4. Benign or malignant
 - Noninvasive
 - Invasive

Schmieden and Westhues^{2,9} base their classification of adenomas upon:

1. The degree to which the cells are undifferentiated
2. The structure of the tumor, whether or not organoid
3. The development of the connective tissue framework, which determines the organoid structure and the macroscopic appearance of the tumor.

On this basis, adenomas may be divided into: (1) benign, (2) relatively benign but sometimes malignant, and (3) definitely malignant.

Group 1 includes all the adenomas with epithelial cells not definitely undifferentiated. At first, this type does not differ either microscopically or macroscopically from simple hyperplasia. Later, as it emerges into the intestinal lumen and is irritated by the contents and by peristalsis, it develops long pedicles. It may be

as large as a cherry or nut and is generally single. It may be found only at autopsy. The club-shaped head is made up of smooth connective stroma containing glandular tubules, which appear to be normal, as does the epithelium, except for irregularly distributed small islands in which the cells are undifferentiated and which are recognizable by the fact that the nuclei are larger, flatter, and richer in chromatin than the normal cells and the protoplasm is darker and more homogeneous.

Group 2 is characterized by epithelial undifferentiation extending to the glandular structure but especially evident in the pedicle and cover epithelium. The nuclei are large, striated, and flattened, with a papillary tendency in the pedicle. The foci of undifferentiation are not clearly defined, and there are zones of progressive transition. Later, these adenomas may become very large and villous with a branching base. The periphery shows a higher degree of undifferentiation than do the central portions. The organoid structure is evident; the connective tissue framework is well developed; and the ducts are regularly distributed and not compressed against each other. These tumors may become very large before they degenerate.

Group 3, the malignant form, shows cellular undifferentiation in the pedicle and cover epithelium and proliferative invasion of the deep portions and base. The nuclei are long, narrow, and dark, and the mass projects into the intestinal lumen. The peripheral portions, made up of undifferentiated glandular tubules, differ absolutely from the central portion with normal epithelium. On the other hand, the irregular, anarchic construction of these tumors differs completely from the organoid structure of the adenomas in group 2.

This classification covers histologically all the stages between benign and malignant mucosal adenomas.

PATHOGENESIS AND PATHOLOGY

Dukes, in 1930, laid down perhaps the most definitive pattern for the pathogenesis of adenomatosis.¹ He stated that the lobulated adenoma arises from the deep, glandular epithelial cells lining the intestinal mucous glands at the bottom of the crypt of Lieberkühn (figure 1 above). With growth, a nodule forms in the submucosa which elevates the mucosa and expands, protruding into the lumen and forming a tiny sessile adenoma with a grossly imperceptible short pedicle. The stalk lengthens by virtue of intestinal peristalsis and/or traction exerted by the passage of feces over it. Villous adenomas origi-

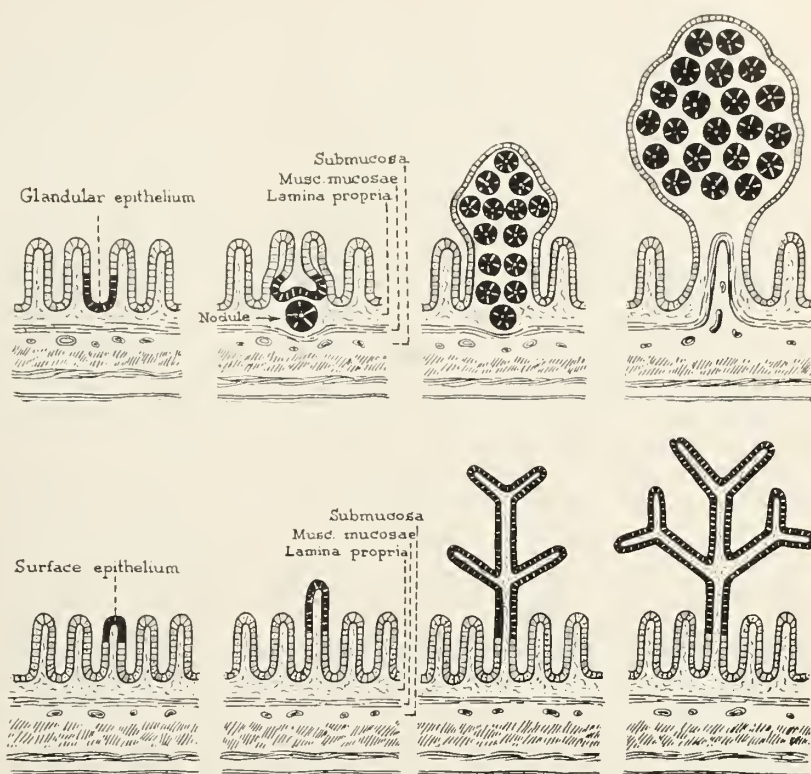


Fig. 1 (above). Genesis of the lobulated adenoma. (below). Villous adenoma. (From DUKES, C. E.)

nate in the superficial cells of the glandular epithelium with the villi ramifying through a long papillary crownlike growth (figure 1 below). Because of the great amount of mucus produced by villous adenomas, Hopping¹⁰ has entertained the idea that this peculiar type of adenoma finds its origin in proliferation of the goblet cells of the mucosa rather than in the superficial glandular epithelium.

Adenomas are sessile or pedunculated and may vary in size from several millimeters to large tumors which may completely encircle the bowel. Swinton³ reported that over one-half of the adenomas that were being discovered in their clinic were less than 0.5 cm. in diameter. A benign adenoma can be described as a pedunculated or sessile glandular structure showing proliferation of intestinal epithelium without invasion of the muscularis mucosae, lymph channels, or blood vessels. Microscopically, it consists of hyperplastic well-differentiated epithelial cells of uniform appearance supported by a central core of loose connective tissue. They contain stalks of varying numbers, sizes, shapes, and lengths, which differ from the normal colonic mucosa in which only a single layer of cells lines the crypts and covers the surface. Some of the cells contain mucus and some exhibit a fair number of mitoses.

In villous or papillary adenomas, the papillary projections are attached to a wide sessile base. They are soft, spongy, and friable. Microscopically, they consist of an overgrowth of epithelium which is arranged in a single or in a pseudostratified layer over scanty stromal prolongations. Each individual prolongation seems to arise from a mucosal base line rather than from a common stalk. These papillary fronds are covered with a surface type of intestinal epithelium which is fairly well differentiated, although cells are frequently more crowded than the normal and have hyperchromatic nuclei. Goblet cells are rather frequent. Swinton and associates¹¹ believe that they are but variants of adenomatous polyps.

It is generally believed that pedunculated and sessile adenomas constitute 95 per cent of all rectal adenomas and that villous adenomas account for about 5 per cent. Villous adenomas are usually seen in the older age group and rarely occur above the rectosigmoid area of the colon.

RELATIONSHIP TO CARCINOMA

Cancer of the colon and rectum ranks third among the causes of deaths from malignancy. About 15 per cent of colonic and rectal cancers show evidence of having originated in an adenoma, and there is presumptive evidence that

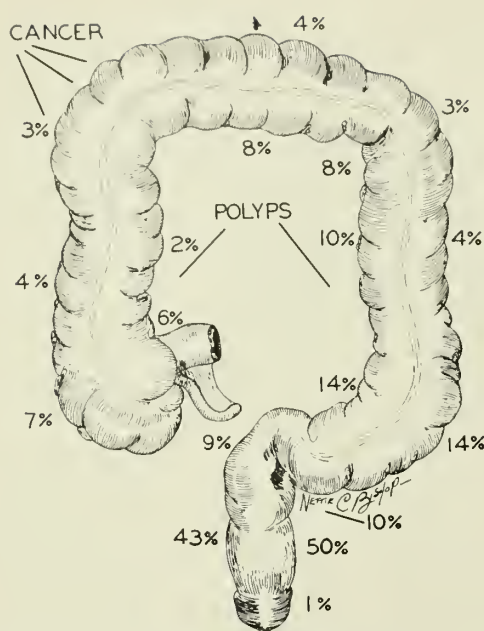


Fig. 2. Comparative distribution of cancer and polyps in large bowel. (From COFFEY, R. J., and BRINIG, F. J.)

an additional 15 per cent have their origin in adenomas.^{12,13} Some authors estimate that at least 50 per cent of the adenomas of the colon will eventually become malignant.¹ Coffey and Brinig¹⁴ estimate that a 75 per cent adenoma origin of cancer of the large bowel is essentially correct and possibly too low.

Some well-established facts have evolved which lend evidence to the adenoma-cancer relationships:

1. Benign mucosal adenomas are present with increasing frequency in the older age groups. Cancer of the colon likewise occurs more often in the aged.

2. About one-third of patients with adenomas have multiple adenomas. The Mayo Clinic found associated adenomas in 34 per cent of patients with carcinoma of the colon and rectum. Coffey and Brinig¹⁴ report this association in 33 per cent of their cases.

3. There is a definite similarity between age incidence and location of benign mucosal adenomas and of malignant disease of the colon and rectum. Ravdin and Ravdin⁵ state that 95 per cent of benign adenomas of the colon and rectum are of epithelial origin and that 5 per cent are of mesenchymal origin. We see a close parallel in the series of 1,202 cancer cases of Broders and associates,⁶ in which they found 99 per cent were carcinomas and 1 per cent were sarcomas. A striking parallelism exists in the distribution of adenomas and cancer in the large

bowel (figure 2). The site of predilection for both is in the lower sigmoid and rectum, hence, within reach of the sigmoidoscope.¹⁴

4. All stages between benign mucosal adenomas and cancer of these organs can be demonstrated histologically. Reversion to the more immature or undifferentiated type of cells is commonly spoken of as atypism. This is characterized by large vesicular or hyperchromatic nuclei, frequent mitosis, and excessive stratification. When there is invasion through the basement membrane or the muscularis mucosæ or of the blood vessels or the lymph tracts, the lesion is regarded as frank carcinoma.⁷ In 1939, Swinton and Warren presented the histologic criteria for adenomas of the rectum and colon. The three criteria were anaplasia, irregularity of architecture, and invasion. It was necessary to have at least two of these three factors present before making a diagnosis of cancer, with one exception, that of definite lymphatic or intravascular invasion.¹⁵

5. Cancer of the large bowel frequently assumes a polypoid form suggesting a relationship to an adenoma.

6. The development of cancer has been observed at the exact site of a previously observed adenoma.¹⁴ Removal had been refused or neglected.

7. Probably the most irrefutable evidence of the adenoma-cancer relationship is the fact that microscopic cancer or carcinoma in situ is commonly found in grossly benign adenomas.^{3,14} According to Bacon and associates,² malignant changes are first apparent in the more pendulous and crowded areas of the adenoma and they feel, with others, that an adenoma is almost always a mere stage in the evolution of adenocarcinoma.

INCIDENCE

Adenomas are the most common benign tumors occurring in the colon and rectum. Fifty-nine per cent of all benign lesions of the colon are adenomas.⁹ Rankin expressed the opinion that 60 per cent of all benign lesions of the colon were adenomas.¹

Polypoid lesions of the colon and rectum may be of mesenchymal origin and include fibromas, lipomas, leiomyomas, lymphomas, or angiomas. These tumors are uncommon and rarely undergo sarcomatous degeneration. The epithelial tumors, however, constitute over 95 per cent of adenomas and have a far greater predilection for malignancy.⁸

The incidence of adenomas increases with advancing age, with a rather sharp rise after the

fourth decade. Hence, adenomas other than the hereditary type are most common in middle-aged and elderly individuals. Hayes and Burr¹² collected a large number of statistics on the reported incidence of adenomas found on proctosigmoidoscopic and autopsy examinations. These statistics were compiled from the works of several authors. The incidence found on physical examinations varied from 5 to 17 per cent. A total of the physical examinations and total number of patients in whom adenomas were found showed an incidence of 9.7 per cent in a total of 17,149 cases. In a total of 30,494 autopsies, an incidence of 9.6 per cent was noted. These figures suggest that about 10 per cent of adults have adenomas of the rectum and colon.

It is difficult to determine accurately how many adenomas cause symptoms, but Swinton and Doane¹⁵ have estimated that not over 20 per cent of patients with benign adenomas of the terminal bowel have associated bleeding or other referable symptoms. This stresses the importance of including proctosigmoidoscopic examination as part of the routine physical examination whether symptoms of rectal or colonic disease are present or not.

In my series, 200 proctosigmoidoscopic examinations were performed. This figure does not include the repeat follow-up examinations. Proctosigmoidoscopy was carried out as part of the routine physical examinations and because of the following symptoms indicating rectal or colonic disease: (1) bleeding or passing of mucus, (2) change in bowel habits, (3) tenesmus, (4) constipation, (5) diarrhea, (6) abdominal cramps or pain, and (7) hemorrhoids—proctosigmoidoscopic examinations were performed routinely prior to hemorrhoid surgery.

In the pathology found by these examinations, 6 patients had carcinomas, 42 had benign adenomas, 1 had an abscess, 2 had acute proctocolitis, and 2 had melanosis coli. Only lesions that were within the reach of the 25-cm. sigmoidoscope are included in the above figures. This gives a 3 per cent incidence of carcinoma and a 21 per cent incidence of benign adenomas. Of the 42 patients with adenomas, 26 had single adenomas, 16 had multiple adenomas, 2 had pedunculated adenomas, and 38 had sessile adenomas. There were 2 with villous adenomas. Six had adenomas above the 20-cm. level.

An incidence of 21 per cent is somewhat higher than the national average of approximately 10 per cent. The age of the patients and the fact that the majority of them had symptoms indicating rectal or colonic disease probably accounts for this higher incidence. Fifteen patients

in whom adenomas were found were over 60 years of age; 20 were between the ages of 40 to 60; and only 6 were under 40 years of age.

Except for 1, the 6 patients with carcinomas were over the age of 60. This early carcinoma was detected by digital examination in a 52-year-old man during a routine examination.

With the more frequent use of broad-spectrum antibiotics, more cases of acute proctocolitis are being seen. Two such cases were encountered in this series. Two cases of melanosis coli were noted. This benign condition occurs in people who abuse cathartics of the anthracene group, which include cascara sagrada, senna, aloe, rhubarb, and frangula. The condition is reversible and does not show any precancerous tendencies.¹⁶ No cases of familial adenomatosis were found.

SYMPTOMATOLOGY

The majority of smaller adenomas produce few, if any, symptoms. When present, they vary a great deal in kind and intensity. This fact serves to stress the importance of a thorough investigation of any symptoms referable to the rectum and colon. In an analysis of symptoms in 100 cases of adenomatosis of the colon, Acuff¹ found that symptoms appeared in the following order: bleeding, 62 per cent; intermittent diarrhea, 42 per cent; abdominal cramps, 24 per cent; pain, 18 per cent; anemia, 36 per cent; positive roentgen signs, 15 per cent; positive sigmoidoscopic-proctoscopic signs, 72 per cent; and multiple and combined signs and symptoms, 28 per cent. In this same article, he reports a case of a boy, aged 1 year, 6 months, with intestinal obstruction due to a large pedunculated adenoma.

Rectal bleeding is the most common and most significant complaint of adenomatosis and frequently is the only symptom apparent. Usually, the blood is mixed with the stool, but it may be passed as a pure rectal discharge. In villous adenomas, the predominant symptom is rectal bleeding associated with diarrhea. The diarrhea has been variously described as bloody, jellylike, watery brown, or mucous.¹¹ Tenesmus and mild colicky pain are not infrequent symptoms and are believed due to traction on or intussusception of a pedunculated adenoma.¹¹ These conditions may be severe and usually of a transient nature. Anemia may occur in cases with frequent bleeding episodes. Sometimes, profound anemia occurs in cases of multiple adenomatosis.

DIAGNOSIS

In every patient in whom symptoms of colonic and rectal disease appear, adenomas should be

suspected, and a thorough search should be made for the lesion. Such a search should include digital, anoscopic, and sigmoidoscopic examinations and roentgenographic studies. Swinton³ states that between 50 and 60 per cent of all malignant diseases of the colon and rectum is within reach of the examining finger. Hawthorne¹³ estimates that more than 60 per cent of the malignant and potentially malignant lesions of the colon is within reach of the 25-cm. proctosigmoidoscope. Coffey and Brinig¹⁴ believe that 75 per cent of carcinomas and 66 per cent of adenomas occur in the rectum and sigmoid colon and, hence, are potentially within the reach of the sigmoidoscope. Turell and associates⁷ report that 90 per cent of adenomas can be reached by the 25- to 30-cm. sigmoidoscope.

It is well known that benign adenomas and also sizable malignancies of the upper rectum and lower sigmoid region, which are easily apparent on proctosigmoidoscopic examination, can be completely overlooked on radiographic studies. The extreme importance of the proctosigmoidoscopic examination is obvious, for, with this instrument, 60 to 75 per cent of all diseases of the rectum and colon can be visualized directly and many can be definitively treated.

Credit for the introduction of the first practical sigmoidoscope is given to Kelly of Johns Hopkins Hospital, who first introduced this instrument in the latter part of the eighteenth century.¹⁷ The instrument was 35 cm. in length. Today, many good scopes are available, and the examination can be performed without a great deal of complicated equipment. It can be done satisfactorily with the patient in the knee-chest or lateral Sims' position. Special tables to allow examination in the inverted position usually are unnecessary, although some feel that it is easier to reach the 25-cm. level with the patient in this position. I employ the knee-chest and lateral Sims' positions and find them quite satisfactory.

Several other instruments, which are essential in addition to the proctosigmoidoscope, are an angulated biopsy forceps and a long suction rod. The ordinary sigmoidoscope may be used in children over 2 years of age.

My routine in preparing the patient for proctosigmoidoscopy is to schedule the examination for 2:00 or 3:00 P.M. The patient is instructed to begin at 9:00 A.M. to take 3 or 4 tap-water enemas at one-half hour intervals or till the solution returns clear. If it is more convenient to do the examination on the day the patient is first seen, an enema preparation contained in one of the plastic disposable units is used. This has not

proved as satisfactory as the aforementioned method but usually provides adequate preparation.

If treatment as well as diagnosis is anticipated, equipment should include a cold angulated biopsy forceps, ball-tip electrode for coagulation, a loop resector, and a flexible loop snare. Grasping forceps, angulated alligator forceps, and angulated scissors may be used occasionally.

Exfoliative cytology has been used in the diagnosis of carcinoma of the rectum and colon with varying results, and cell studies seem unnecessary in lesions accessible to sigmoidoscopic biopsy.¹⁸

TREATMENT

It is generally conceded that all adenomas of the colon and rectum should be removed or destroyed. The type of treatment used depends upon the location, type, and size of the adenoma. The majority of adenomas occur below the peritoneal reflection and can be treated adequately without much danger of complication. Above the peritoneal reflection, the danger of perforation is present. Most surgeons are of the opinion that the smaller lesions can be treated if care is used. In the series presented, adenomas above the peritoneal reflection were removed by cold biopsy forceps and the base was coagulated only if necessary to control bleeding.

In only 1 case did a complication occur. One patient complained of lower abdominal pain the day after operation and had a temperature of 99.8° F. His symptoms subsided in twelve hours, and he had no further difficulty.

Accepted treatments of the various types of adenomas are as follows:

Tiny adenomas (less than 1 cm. in diameter). These adenomas are removed with cold angulated forceps, and the base is fulgurated. If fulguration alone is done, these adenomas tend to recur. There is disagreement as to whether all these lesions should be submitted for pathologic study. Carcinoma has been reported in adenomas less than 1 cm. in diameter.^{14,19} This occurrence is quite infrequent, and lesions less than 5 mm. in diameter are not usually studied microscopically. Lesions larger than 5 mm. should all be studied.

Pedunculated adenomas. Lesions of this type are best removed by using a flexible snare loop. The loop is passed over the body of the adenoma to its base, and the adenomas are removed by closing the snare and severing the adenoma at its base with diathermy current.

Sessile adenomas. These lesions are generally more difficult to remove, but many can be re-

moved by loop resector and cutting current. They may also be removed piecemeal with biopsy forceps and the base fulgurated.

Villous adenomas. These tumors comprise about 1 to 2 per cent of the total cases of benign and malignant tumors of the large bowel.^{13,20} Authorities disagree concerning their treatment. Lee and Kay²⁰ believe that these tumors have a high malignant potential and stress a more radical approach to their treatment, that is, low anterior resection and abdominoperineal resection. Turell and associates⁷ do not support the need for radical resection of all villous adenomas. Swinton and co-workers¹¹ believe that these tumors have a low malignant potential even though a high percentage show atypical hyperplastic epithelial changes, and many even show early and localized areas of cancer. They feel that a conservative approach is justifiable when adequate follow-up is maintained.

Noninvasive malignant adenomas. These are adenomas with either long or short pedicles, in which there are foci of carcinoma. The pedicle is free of carcinoma. These lesions are removed at their base with a high-frequency snare. Turell and associates⁷ have noted no recurrence in 31 cases thus treated, which have been observed one to five years. Other authorities¹²⁻¹⁴ agree with this method of treatment.

Invasive malignant adenomas. Carcinoma develops early in these adenomas and in their stalks or pedicles. These lesions should not be treated with local excision but require abdominoperineal resection or anterior resection, depending upon the location of the lesion.

Adenomas above the reach of the proctosigmoidoscope. In pedunculated adenomas above the reach of the sigmoidoscope, transabdominal colotomy with local removal of the adenoma at its base appears to be adequate unless there is induration and fixation. Sessile and villous adenomas above the reach of the sigmoidoscope should be treated with segmental resection. When multiple adenomas exist, subtotal colectomy and ileoproctostomy must be considered as advocated by Lillehei and Wangenstein.²¹ Colonoscopy—viewing the lumen of the bowel endoscopically through multiple incisions in the bowel wall—is advocated as a means of detecting multiple adenomas of the colon not detected by x-ray studies.^{21,22}

Large adenomas above the peritoneal reflection. It is hazardous to attempt removal of large adenomas above the peritoneal reflection through the proctosigmoidoscope because of the danger of perforation. These are best removed transabdominally.

Adenomas near the anal orifice. A number of lesions develop in this location. They can usually be surgically excised. In my series, one such sessile adenoma completely encircled the rectum at the 4-cm. level. The lesion was biopsied on two occasions, and specimens were obtained from four different locations. These specimens were benign, and the lesion was excised via the anal canal. It proved to be benign, and there has been no evidence of recurrence after four years.

Adequate follow-up observation should be included in the treatment of adenomas. I check in two months, then in six months, and yearly thereafter. In villous adenomas and noninvasive malignant adenomas, reexamination should be more frequent.

SUMMARY AND CONCLUSIONS

The experience and study of many medical men has in the past several decades resulted in the establishment of uniform, basic concepts in the etiology, incidence, pathogenesis, and methods of diagnosis and treatment of adenomas of the colon and rectum. These concepts have been reviewed and summarized.

A series of 200 cases of adenomas of the rectum and colon are presented. The incidence of 21 per cent is somewhat higher than the national average of 10 per cent. This is attributed to the fact that the majority of patients examined were over 40 years of age and the fact that most patients examined had symptoms of rectal or colon disease.

The adenoma-carcinoma sequence is discussed. Adenomas of the colon and rectum are definitely premalignant and should be treated adequately by local removal or destruction. Radical surgery is indicated if invasive carcinoma has developed.

Early diagnosis, proper management, and careful follow-up are essential if cancer prophylaxis of the large bowel is to be appreciably improved.

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THE LONG-TERM PROGNOSIS of Hodgkin's disease is far better when the disease is limited to 1 lymph node group than when 2 or more groups are affected. Patients in either category with systemic symptoms have the poorest outlook.

Regional node dissection was performed for 18 patients with Hodgkin's disease, and 11 of them have survived five to thirteen years without clinical evidence of disease. In 17 cases, only 1 lymph node group was affected. The other patient had cervical and contiguous axillary disease, and both areas were dissected in continuity. None of the patients had chest lesions, spleen enlargement, eosinophilia, fever, general pruitus, or other signs of systemic disease.

Postoperative irradiation of 900 to 1,200 r in air was delivered to the disease area in 10 of the patients. Although this dosage sometimes eliminates local disease, 2,500 to 3,000 r is the recommended tumor dose. Also, 5 of the long-term survivors received no radiation. Therefore, the effective treatment was probably surgery rather than irradiation.

Operation and large doses of radiation may be equally effective against restricted Hodgkin's disease. However, surgery is preferable, particularly for young and middle-aged patients, because adequate radiation to the neck entails slowly progressive, major changes in the pharynx, larynx, and esophagus. Since spread to contiguous lymph node groups may occur in an orderly manner, prophylactic irradiation of adjacent lymph node areas after operation may be advisable.

DANLEY P. SLAUGHTER, M.D., STEVEN G. ECONOMOU, M.D., and HARRY W. SOUTHWICK, M.D., University of Illinois, Chicago, and St. Francis Hospital, Evanston. *Ann. Surg.* 148:705, 1958.

Posterior Mediastinal Goiter

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THERE IS CONSIDERABLE CONFUSION in the English literature today concerning intrathoracic and substernal goiters. No generally accepted workable classification has been offered, and the surgical management of the various types has varied considerably. A proposed classification is as follows:

- I. Cervical goiter
 - a. Confined to neck
 - b. Intrathoracic extension, substernal
- II. Intrathoracic goiter
 - a. Superior mediastinal
 - b. Inferior mediastinal
 1. Anterior mediastinum
 2. Middle mediastinum
 3. Posterior mediastinum

The typical substernal cervical goiter would be exemplified by a large adenomatous goiter with a cervical mass which had extended into the mediastinum and, usually, the anterior mediastinum.

The superior mediastinal goiter would be entirely confined to the thorax, or its greater diameter would be found in the thorax connected to the cervical thyroid by a pedicle. The inferior mediastinal goiters would be divided into anterior, middle, and posterior mediastinum, depending upon the location.

Of the inferior mediastinal goiters, the posterior mediastinal goiter is the most common. The intrathoracic goiters are all of the adenomatous type. These are usually located on the right and arise, as described by Sweet,¹ from the posterolateral aspect of the thyroid lobe and descend into the posterior mediastinum passing through the superior mediastinum. A line drawn transversely at the bifurcation of the trachea separates the superior from the inferior mediastinum. This line is at the same plane as the entrance of the azygos vein into the superior vena cava. It extends between the lower aspect of the manubrium and the body of the fourth thoracic vertebra. Thus, only the inferior mediastinum is divided into an anterior, middle, and

a posterior mediastinum. Therefore, a true posterior mediastinal goiter must, by definition, descend below the azygos vein. Cases reported in the literature as posterior mediastinal goiters have been found to be cervical goiters with intrathoracic extensions into the superior mediastinum or intrathoracic goiters occupying the posterior portion of the superior mediastinum.² A review of English literature reveals that the Berards, in 1938, reported the first case of posterior mediastinal goiter.^{3,4} In the same year, von Haberer³ reported the second case. Roholm,³ in 1938, reported a case diagnosed by aspiration biopsy in a patient who was not operated upon. Urban,³ in 1937, reported 2 cases without giving details. Henschen,³ in 1940, discussing a paper by Reufer, reported a single case. Mora,³ in 1944, reported a single case in which the goiter was removed by the cervical route. Rives,⁵ in 1947, reported 1 case which was probably a posterior mediastinal goiter. Sweet,¹ in 1949, reported 6 cases, 4 of which were true posterior mediastinal goiters. The first 2 cases probably represented early stages in the development of a posterior mediastinal goiter which had not descended into the true posterior mediastinum. Linnell and Piercy,⁶ in 1949, reported the case of 1 patient on whom an operation was performed. Keynes,⁷ in 1950, reported 2 cases. Tomkinson,⁴ in 1951, reported 3 cases. Crohn,⁸ in 1951, reported 1 case. Wilson,⁹ in 1951, reported cases in 3 patients, 2 of whom were operated upon. Thus, at the time the following patient was operated upon, there had been 17 verified cases with operative details previously reported in the literature.

CASE REPORT

M.L.C., a 59-year-old woman, complained of cough and dyspnea of seven years' duration. The patient consulted her physician in 1947 because of a persistent cough, recurrent chest colds, and dyspnea. A roentgenogram of her chest at that time revealed an intrathoracic mediastinal mass. Her basal metabolic rate was plus 11 and plus 8 on two occasions. She refused therapy at this time. Her symptoms increased in severity, and dysphagia developed during 1953. Physical examination revealed a thin, extremely nervous, white woman. The positive findings were confined to her neck. A nodular goiter was

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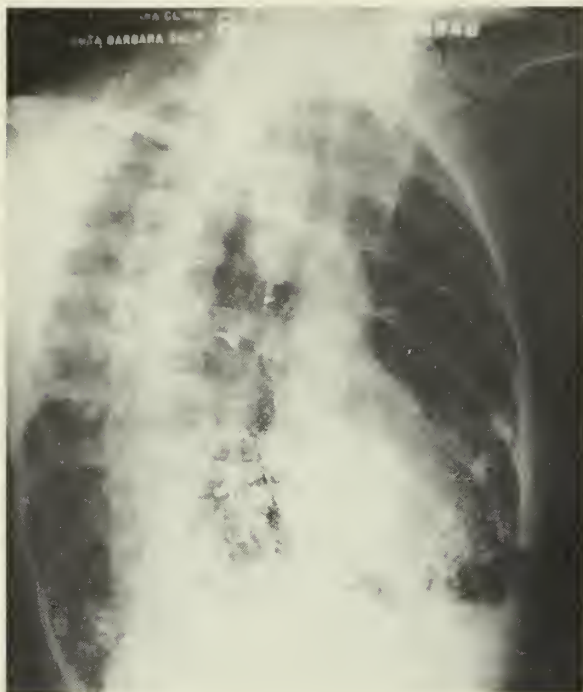


Fig. 1. Right oblique bronchogram showing tumor mass in posterior mediastinum extending to thoracic inlet.

palpable in the neck, the left lobe being easily palpated, whereas the right lobe without nodules was barely palpable. The cervical goiter on the left ascended with swallowing and an intrathoracic projection could not be felt at either inferior pole. In 1947, a bronchogram (figure 1) and, in 1952, a barium esophagram (figure 2) revealed a tumor mass lying between the trachea and esophagus, displacing the former anteriorly and distorting the esophagus. On January 11, 1954, the density in the mediastinum was larger, having increased in size since 1947 (figure 3). A diagnosis of posterior mediastinal goiter was made and excision advised. On April 6, 1954, the patient was operated upon. A right posterolateral thoracotomy incision was made through the bed of the resected fourth rib. Arising from the right lobe of the thyroid situated between the vertebral bodies and the superior vena cava, a large posterior mediastinal goiter was found. The mass measured 12 x 6 cm. and was located behind the innominate and the subclavian arteries and the right recurrent laryngeal nerve. The inferior pole of the tumor extended 4 cm. below the azygos vein. Two blood vessels, one from the aorta and the other from the superior vena cava, entered the medial aspect of the tumor mass. These are shown in figure 4, with a silk ligature about one of them. After identifying and preserving the right recurrent laryngeal nerve, the tumor was divided beneath the right subclavian artery by severing the pedicle connecting the cervical mass with the posterior mediastinal goiter. The pathologic report revealed that the tumor weighed 90 gm., and the microscopic diagnosis was "multiple mixed fetal colloid adenomas of the thyroid with recent and old hemorrhage and calcification." The postoperative course was entirely uneventful. The dysphagia subsided immediately, and the dysp-



Fig. 2. Right lateral roentgenogram taken after barium esophagram revealing distortion of the esophagus and calcification within mediastinal tumor. The tracheal air column is well outlined.

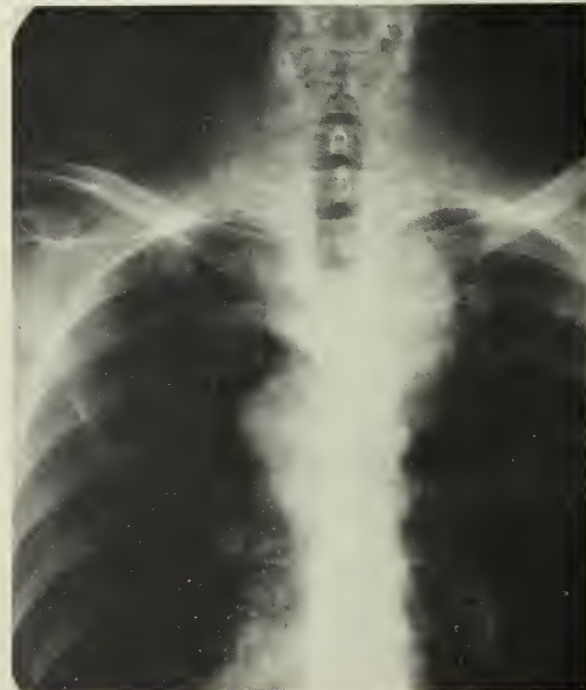


Fig. 3. Posterior-anterior roentgenogram showing mediastinal tumor presenting into right thorax and extending below the aortic arch. (NOTE: this roentgenogram was reversed in photographing.)

nea was somewhat improved. A roentgenogram of the chest taken four and one-half months postoperatively is shown in figure 5.

Because of the presence of the goiter in the neck, the patient returned on August 24, 1954, and underwent a subtotal cervical thyroidectomy. The left lobe of the thyroid contained large colloid nodules. The right lobe of the thyroid was free of any nodule, and its inferior pole was lying just below the clavicle. The site of the division of the posterior mediastinal goiter was on the posterolateral aspect of the gland. Microscopic diagnosis of the cervical thyroid was adenomatous goiter.

DISCUSSION

The common cervical goiter with an intrathoracic extension into the superior mediastinum can usually be removed safely and readily through the low cervical incision by the methods of Lahey.¹⁰⁻¹⁵ Posterior mediastinal goiters, to the contrary, should be extirpated transthoracically because of the danger of hemorrhage and damage to the recurrent laryngeal nerve. These goiters lie against the vertebral column and usually are located on the right side and, thus, displace the esophagus somewhat to the left and the trachea forward. They are located posterior to the recurrent laryngeal nerve and the inferior thyroid artery and also the carotid sheath, innominate and subclavian arteries, innominate vein, and the superior vena cava on the right. The space through which the posterior mediastinal goiter must be removed by the cervical approach is small, and, in extracting a large gland from beneath the great vessels, injury to the vascular structures and the recurrent laryngeal nerve is difficult to avoid. As shown in this case, an intrathoracic blood supply may exist which would make removal through a cervical incision extremely hazardous. Cases have been reported in which large intrathoracic goiters were removed through a cervical incision, resulting in death from uncontrollable hemorrhage¹⁶ or in recurrent laryngeal paralysis. Reoperation has been necessary for the control of hemorrhage in some cases operated on by the cervical approach.¹⁷ Also, if such lesions are removed by morcellation or fragmentation technic, there is a distinct possibility that portions of the gland will be left in the chest. In the case reported by Mora,³ the roentgenogram of the chest taken one month postoperatively revealed a distinct mediastinal shadow which might well represent retained remnants of the thyroid. With the mediastinal structures well exposed through a standard posterolateral thoracotomy incision, injuries to major vascular structures can usually be avoided. Intrathoracic goiters located in the superior mediastinum may be safely removed by the usual low-cervical incision. If difficulties are encoun-



Fig. 4. Photograph taken at operation, which shows silk ligatures encircling the artery from the aorta which entered the medial aspect of the tumor.



Fig. 5. Posterior-anterior roentgenogram of chest taken four and one-half months after surgery.

tered, some surgeons¹⁸ recommend the sternal-splitting incision, but it is felt that these lesions can best be handled by the usual low-collar cervical thyroid incision plus an anterior thoracotomy incision on the side of the chest containing the greatest projection of the tumor mass.

In the case reported in this article, the mediastinal goiter and the cervical goiter could have been removed at the same time except that the patient did not wish to have the cervical thyroid removed simultaneously.

Although the possibility of an aberrant mediastinal goiter is real,^{5,19} it is felt that these lesions are very rare.

The posterior mediastinal goiter must be differentiated from a primary mediastinal tumor, such as a thymoma, bronchogenic cyst, neurogenic tumor of the mediastinum, gastroenteric cyst, and lipoma. Aneurysms of the great vessels must also be considered in the differential diagnosis.

The diagnostic aids that are valuable in the diagnosis of mediastinal goiters are roentgenograms of the chest with planograms, barium esophagrams, and Lipiodol planograms if the tracheal air column is not well demonstrated in the planograms. Angiocardiography may also reveal valuable preoperative information.²⁰ Radioactive iodine (I^{131}) might be useful in locating and diagnosing intrathoracic goiters. However, the posterior mediastinal goiter reported by Crohn,⁸ failed to take up radioactive iodine, although the cervical gland did.

SUMMARY

1. Intrathoracic goiters increase in size and should be removed when first seen, as an increase in size augments the operative difficulties.

2. Large posterior mediastinal goiters should be removed employing a posterolateral thoracotomy incision.

3. The blood supply of some intrathoracic goi-

ters has a thoracic origin from the aorta and vena cava as here reported. Attempts to remove such goiters by the cervical approach might result in death from hemorrhage.

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ADMINISTRATION OF RADIOACTIVE IODINE is an easy, convenient, and relatively safe way to produce hypothyroidism and abolish episodes of supraclavicular tachycardia in euthyroid patients who are resistant to other therapy.

Oral doses of 6 mc. of I^{131} are given once a week until the amount given is 25 to 30 mc. This technic avoids the danger of suddenly releasing large amounts of thyroxin into the blood stream of a severely ill cardiac patient.

I^{131} reaches highest hypometabolic levels two to three months after treatment. During treatment, patients are asked to restrict physical and emotional activities. Obvious myxedema develops occasionally, necessitating daily oral thyroid treatment.

ELIOT CORDAY, M.D., HERBERT GOLD, M.D., and HENLY L. JAFFE, M.D., University of California, Los Angeles. *Circulation* 17:900, 1958.

Forty Years of Orthopedic Surgery

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ALTHOUGH I WAS GRADUATED from medical school in 1918, my claim to knowledge of forty years of orthopedic surgery is based on the fact that I, with 31 classmates at the Johns Hopkins University Medical School, volunteered to go to France with the base hospital unit from that institution in May of 1917 to serve in the American Expeditionary Forces. After a few months in various tasks, I was assigned to the ward known as the "Orthopedic Ward," and there I received my first indoctrination into the care of orthopedic patients. These, of course, were mostly men who had been wounded in battle or injured in the various training programs that were going on about us.

From this group of 32 students, 3 men became interested in orthopedic surgery and subsequently devoted their careers to the specialty. They are the late J. Albert Key, A. H. Brewster, and myself.

1887 to 1919

Up to the time of World War I, orthopedic surgery had been an ill-defined specialty, with a number of men devoting full time to this field only in the larger metropolitan centers and particularly in cities with medical schools.

The American Orthopaedic Association was founded in 1887. According to a statement in volume 1 of the *Transactions* of that association, the formation of the organization "was first formally discussed at a meeting of gentlemen interested in the subject held at the house of Dr. Shaffer in New York on January 29, 1887." Apparently, there were 14 men at this meeting. After some discussion, 10 of them voted in favor of organizing, 2 voted against organizing, and 2 did not vote.

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Dr. Gibney and Dr. Shaffer had formed plans independently for the establishment of such an association, and, at this meeting, Dr. Gibney was elected chairman and Dr. Lovett, secretary.

The first annual meeting of the American Orthopaedic Association was held at the Academy of Medicine in New York on June 15 and 16, 1887. Dr. Gibney was elected chairman for the meeting and Dr. L. H. Sayre, secretary. Thirty-five names are listed as members of the association in this first volume. Eighteen of the members were from New York City; 3 were from Boston; and 5 were from Philadelphia.

From that year until 1917, the specialty developed slowly. Most of the work had to do with the care of crippled children. Patients afflicted with such diseases as tuberculosis of bones and joints, rickets, scoliosis, and poliomyelitis were those who most frequently came under the care of the orthopedic surgeon.

In a book called *The Division of Orthopaedic Surgery in the A.E.F.*, Dr. Joel E. Goldthwait has told the story of the organization of the orthopedic services for the care of the wounded during that conflict. In the foreword to this volume, he wrote, "Also recognizing the fact that a large proportion of the war casualties required special care with reconstruction work for the preservation of the best possible function to the damaged part, the position of the Orthopaedic Surgeon became greatly magnified over the position held in civil life. The need of men trained to think in terms of the ultimate function of the damaged or diseased part, representing as this does the basic principle of the Orthopaedic Profession, became very great and this was especially emphasized by the experience in a medical unit that was sent over to help the British before our entering the war, in which Dr. Osgood and Dr. Allison at different times served as orthopaedists. . . ."

"When this country entered the war in April

of 1917, the first request for help that came from the British was for six base hospitals for general assistance and for twenty orthopaedic surgeons to assist Sir Robert Jones."

Twenty-one men constituted the unit, which was ready within three weeks and sailed for England. They were Ewing, Metcalf, Baldwin, Orr, Cone, Danforth, Eikenbary, Graves, Fayerweather, Kidner, Francisco, Cole, MacAusland, Willard, Abbott, Langworthy, Spencer, Durham, Hall, Billington, and Johnson.

The condition of some 600,000 wounded men was proving to be a great problem to the British, and so, according to Goldthwait, "In the hope of improving conditions already existent, Dr. Robert Jones, practically the only orthopaedic surgeon in Great Britain, was turned to. In a short time, he showed what could be done for some of these wounded soldiers, with results so striking that the government immediately began supporting him in establishing hospitals, not just for housing the wounded men, but for treating them with reference to improving their condition.

"In the beginning, Dr. Jones (later decorated by the King and spoken of as Sir Robert) was not held in high favor by the medical profession of Great Britain and was sneeringly spoken of as a 'bonesetter.' The results of his work, however, with the very limited staff available, made up as they were chiefly of men with very little previous orthopaedic training was so striking that criticism ceased. . . ."

To quote further from Goldthwait, "Previous to the war there had been very little place for the orthopaedic surgeon in Great Britain, and Sir Robert's position was not highly thought of, he being treated much as the osteopath has been treated in our country until comparatively recently. In our country, previous to the war, the orthopaedic surgeon was being tolerated more or less, but was not cordially welcomed by the general surgeon; it was not many years removed from the old so-called 'strap-and-buckle days,' the term that was used in the early days of the orthopaedic work."

These statements by Goldthwait regarding the status of orthopedic surgery in England and Sir Robert Jones's position may be open to question. In a Robert Jones Lecture delivered at the Royal College of Surgeons of England, Alan S. Malkin pointed out many of the remarkable phases of Sir Robert Jones's work and development, quoting from such men as Dr. William J. Mayo and Dr. Robert W. Lovett to show the high regard in which Sir Robert Jones was held, at least by visiting American surgeons.

But, regardless of this, it is certain that by the end of World War I, Sir Robert Jones was held in the highest esteem both by Americans who had gone to England and France and in some close or remote way come under his influence and by his own colleagues and particularly by those who chose to follow his lead in improving the care of battle casualties and those who had sustained fractures of the long bones.

So it is that men of my generation, particularly those who served in France and England with the American Expeditionary Forces, came to regard Sir Robert Jones as the great leader in the movement to make orthopedic surgery a more dynamic and effective specialty.

Although Goldthwait listed more than 500 names as those who served in the orthopedic services of the American Expeditionary Forces, a scanning of these names shows a number who did not remain with the specialty. Still, a number did continue to devote themselves to orthopedic surgery. Many of these, I am sure, had no more "specialty training" than their wartime experience.

On Saturday evening, October 6, 1917, Dr. E. G. Brackett addressed members of the Boston Orthopaedic Club on plans for the development of orthopedic services in the army. The discussion which followed is interesting because it shows the reluctance of some of the general surgeons present to see the orthopedic services so developed. Throughout this discussion, the word "rehabilitation" was used frequently, indicating the lines along which these men were thinking.

After ten months in France with Base Hospital 18 as private soldiers, we received our degrees of doctor of medicine and were commissioned. Three of us, Key, Brewster, and I, were assigned to orthopedics, and our first station was the Rehabilitation Battalion, often called the "Flat-Foot Farm." There an attempt was made to restore some derelict soldiers to front-line duty. The methods were crude and proper equipment was almost entirely lacking, but the idea was there and something was accomplished. Four companies were organized. The first and largest was in charge of some drill sergeants, and most of the time was spent in doing exercises, calisthenics, and exercises for the feet. The companies were graduated upward until the top company contained only men considered able. They were put to the task of marching two or three hours a day with full packs. Those who reached the top company and could remain in that status were returned to duty.

So far as the care of the wounded in World War I is concerned, the treatment consisted of

elaborate types of suspension traction for fractures, wide debridement of wounds, and treatment according to the Carrel-Dakin technic. The latter was a very complicated system of dressings applied under more or less aseptic conditions. Wounds could be cleaned in this way, and, when they were bacteriologically clean, they could be closed.

1919 to 1933

With the end of World War I, we went back to complete our training in orthopedic surgery. My own training was obtained in Baltimore at the Children's Hospital School and the Johns Hopkins Hospital. There we saw an entirely different type of patient from the soldiers we had treated in our army work. We saw numerous patients who had tuberculosis of the bones and joints in all stages of deterioration or amelioration. Many patients who had been crippled as a result of poliomyelitis were in the hospital. Some patients had rickets, with the deformities which that disease produced, and a number of patients had congenital dislocations of the hips and clubfeet.

At that time, Dr. W. S. Baer was allowed to have only 10 beds in the ward service of the Johns Hopkins Hospital. These beds were used as much as possible to furnish material for undergraduate teaching. Patients who required long-term attention were avoided as much as possible. Most children with orthopedic conditions which would entail a long stay in the hospital were transferred to the Children's Hospital School for protracted care. A few patients with old fractures that had not united were seen. Some joints that had ankylosed, usually as a result of gonorrhea, were operated upon. Dr. Baer had established a reputation for his arthroplasty in which he used chemicized pig's bladder as an interposing membrane.

The epidemic of poliomyelitis which occurred in 1916 along the eastern coast, and which was the worst epidemic this country has ever experienced, had left a large number of cripples. These patients continued to fill the wards of most of the hospitals for crippled children for years to come.

In 1922, I completed my resident training in orthopedic surgery and was invited to join the group at the office of Dr. R. W. Lovett in Boston. The other members of the group were Dr. F. R. Ober and Dr. A. H. Brewster. Dr. Lovett had a large practice in orthopedics, for he had gained an extensive reputation for his care of patients with poliomyelitis and for his treatment of scoliosis. His practice was almost entirely non-surgical, and he was meticulous in the matter of

details in the examination and conservative management of his patients. I particularly remember the attention he gave to the details of fitting braces and corsets.

The first year of my stay in Boston, I served on the visiting staff of the Children's Hospital, where I primarily did outpatient work. I was then asked by Dr. Nathaniel Allison, who had come to Boston to head the orthopedic service at the Massachusetts General Hospital, to join his staff. Dr. Allison had completely reorganized the staff there, and almost all the men who had served under Dr. R. B. Osgood were replaced by members of our younger group. Dr. Allison was a stimulating man to work with, and we had a very active service and a very interesting time. It was during this period that Dr. Allison and I accumulated the material on diseases of the joints that was incorporated in our book *Diagnosis in Joint Disease* published in 1931.

The training program for residents in orthopedic surgery at the Massachusetts General and Children's Hospitals had become well known. During this time, several men who have since made fine reputations as orthopedic surgeons were trained there. Training programs of similar scope were also organized in other cities, particularly New York, Baltimore, and Philadelphia.

Next came the various orthopedic travel clubs. The first of these was the Interurban Orthopaedic Club. The Eastern States Orthopaedic Club and that which was then called the Central States Orthopaedic Club (1912) were organized. The Robert Jones Club was organized after the war by a group of men who had served under Sir Robert Jones during the war. I attended one or two meetings and was elected to membership in 1927. No society has meant more to me, for the meetings of this group have been a constant stimulus to me and the source of much knowledge of orthopedic surgery which I would not otherwise have acquired.

The span between 1919 and 1933 was a period in which much in the way of surgical technic was tried and, in many instances, accepted. Many of those who had served in the Armed Forces had learned the value of surgical procedures and proceeded to use them to attack the problems encountered in civil orthopedic practice. Scoliosis, infections and tuberculosis of joints, and both fresh and ununited fractures were being treated increasingly by surgical procedures.

Many surgeons feared to operate on tuberculous joints because of the danger of the formation of sinuses, with secondary infection. Once such a complication took place, amyloid disease might develop, a condition which usually resulted in

death. Today, anyloid disease is almost never seen in infections of bones, but, in my early years in the specialty, this condition was not a rare complication.

Osteomyelitis and septic or staphylococcic and streptococcic infections of joints were often encountered during the early part of this period. All authorities advocated early drainage of the bone or joint affected. In many cases, severely crippling states were prevented by this means, but often the condition was complicated by an active infection of the blood stream and, when such was present, most of the patients died. Currently, acute osteomyelitis is rarely seen, and even a septic joint is unusual. An infected joint complicated by septicemia is exceptionally rare. Rickets has been almost completely eradicated due to recognition of the fact that it is largely caused by vitamin D deficiency.

THE MODERN AGE

In view of the increasing number of men specializing in orthopedic surgery and the limited membership extended by the American Orthopaedic Association, a group of orthopedic surgeons met in Chicago in January 1933 to organize the American Academy of Orthopaedic Surgeons. The growth of this organization and its influence on the development of orthopedic surgery in this country are known to all.

Then, in 1934, some of the men who had formed the American Academy of Orthopaedic Surgeons conceived the idea of an American Board of Orthopaedic Surgery. Members of other specialties had formed boards previous to this year, the first being the American Board of Ophthalmology established in 1916. The success of such certifying boards seemed evident, and, hence, the move to found the American Board of Orthopaedic Surgery was in good order. Active members of the American Orthopaedic Association were admitted as founder-members without examination. Since that time, more than 2,500 candidates for certification have passed the examinations and have been given certificates as diplomates of this board.

Although the methods and decisions of the American Board of Orthopaedic Surgery have been questioned numerous times, few seem to doubt the value of the board as a regulatory mechanism to control the entrance of physicians into the practice of this specialty. Many have questioned the influence of the board's activities on the training programs in orthopedic surgery. Prior to the organization of the board, there were relatively few institutions in which physicians who sought graduate training could find a formal

program for that purpose. With the rapid development of the specialty during World War II, it was obvious that many men who had served in the Army and Navy during the war would become specialists in orthopedic surgery after the war. To complete the training of these men, additional institutions for resident training would be required. A survey of available facilities was made, and a number of institutions were designated as suitable for training orthopedic surgeons. This designation was made only on a tentative or provisional basis.

After a few years, another survey was made and some of the institutions were found inadequate for the type of training required. Since that time, periodic surveys of special training programs in orthopedic surgery have been carried out by the Council on Medical Education and Hospitals of the American Medical Association. A committee called the "Residency Review Committee," composed of members from the American Board of Orthopaedic Surgery and the Council on Medical Education and Hospitals of the American Medical Association, meets twice a year to review recently surveyed services and applications for accreditation as training centers from institutions with new programs.

The effects of all this activity have been to improve the quality of training in orthopedic surgery. This is reflected in the percentages of failures recorded among candidates taking the examinations of the American Board of Orthopaedic Surgery. In the past few years, this percentage has been considerably reduced. Efforts are continually made to improve training programs. No one is inclined toward completely standardized programs, but a more uniform type of training in orthopedic surgery throughout the country is desirable.

I have not touched upon the importance of antibiotic agents in the development of orthopedic surgery. These agents have helped to almost entirely eliminate osteomyelitis and septic joints from orthopedic conditions and from medicine. Similarly, tuberculosis of bones and joints has been greatly reduced, not so much as a result of the use of antibiotic agents as of public health measures and, particularly, the eradication of tuberculous cows from dairy herds. On the other hand, the introduction of antibiotic agents has almost freed the surgical treatment of many bone diseases of complicating infections and has greatly improved the treatment of compound fractures. These compounds have almost eradicated gonorrheal arthritis, formerly a common affliction, which often led patients to seek the aid of orthopedic surgeons.

COMMENT

The rapid growth of orthopedic surgery as a specialty has produced some degrees of conflict with other specialties. Perhaps so much attention has been given to the improvement of orthopedic surgical methods that the possibilities of treatment by conservative methods have been neglected. Physical medicine has arisen to take over—or at least to move toward taking over—some phases of medical care formerly entrusted to orthopedic surgery. Sharp conflicts have arisen as a consequence, but, as orthopedists, we must recognize that the development of rehabilitation by those in physical medicine is in part, at least, due to our own neglect of some phases of the treatment of physically handicapped persons. Use of the term, "rehabilitation," seems to most orthopedic surgeons a device to attract attention to a current development within the field of physical medicine. Application of the term has been curtailed in part by the American Medical Association after protest by a committee of orthopedic surgeons.

Members of other specialties likewise cast speculative glances at some of our work. Plastic surgeons would like to take over all surgery of the hand; a small group of general surgeons has continued to try to develop an American Board of Trauma. Such a board may seem needed, but it might also interfere seriously with the orthopedic surgeon's efforts in his care of traumatic injuries. I have heard that, in some areas, rheumatologists conflict with orthopedic surgeons.

Dissension, such as the foregoing, probably indicates more than anything else the dynamic expansion in all fields of medicine today, and my feeling is that orthopedic surgery always will be subject to pressure from one side or the other, as other specialties are. However, if we keep our standards high, if we continue to spare no effort to give the best possible care to patients seeking our ministrations, and if we seek the aid of specialties which can help us with measures of merit in a cooperative manner, I shall not have much concern about the future of orthopedic surgery as a specialty.

CLOSED REDUCTION of a dislocated hip is usually difficult to perform when complicated by a femoral fracture. Reduction is simplified by placing a Steinmann pin through the greater trochanter and applying a vise-grip wrench on either end of the pin.

During manipulation, one assistant stabilizes the hip and another supports the fractured femur while the operator applies manipulative force on the Steinmann pin, which is securely held with the vise-grip wrench. The pin is removed after reduction is made, and the femoral fracture is treated by skeletal traction through the tibia, with the limb held in a Thomas splint.

This method was used for a patient with a supracondylar femoral fracture and posterior dislocation of the hip. Open reduction was attempted, but no amount of manipulation freed the dislocated femoral head. Finally, a Steinmann pin was driven through the greater trochanter and the pin ends grasped with vise-grip wrenches. This allowed application of considerable force on the femoral head, and the dislocation was successfully reduced. In another patient, the pin was driven through the skin.

D. S. MURRAY, F.R.C.S., Falkirk and District Royal Infirmary, England. *Brit. M. J.* 5093, 1958.

Treatment of Fracture Sequelae

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THE CAUSES OF DISABILITY following fractures may be divided into those associated with bony injury and those associated with soft tissue injury.

The causes associated with bone injury are not usually amenable to treatment by physical methods. These consist of malunion due to inadequate reduction or inadequate maintenance of reduction and nonunion due to inadequate healing of the bone. It is essential that the fracture be reduced adequately; that is, that a functional reduction be obtained and maintained continuously for a sufficient length of time for healing to occur. Physical medicine is not a substitute for adequate reduction and immobilization. If the fracture is compounded, infection may interfere with normal use; and nonunion or malunion may occur from this cause. However, with the more modern use of antibiotics and chemotherapy for the prevention of infection and with better surgical technics for the debridement of the wound and the removal of all nonviable tissue, the incidence of infection in compound fractures has been reduced markedly, so that now infection is very rarely the cause of poor function. With the newer methods of reducing fractures and maintaining reduction by snug-fitting, nonpadded plaster casts or by internal fixation of the fractured fragments and by the careful control of reduction by roentgen examination, the numbers of poor functional results due to bony considerations have been greatly reduced. Therefore, disabilities due to the bone injury are becoming more and more limited to those cases in which large bony defects have been produced or in which severe comminution has made accurate reduction impossible.

The result is then that most of the disabilities that develop after fractures are caused by injuries to the soft tissues, and these may be treated by physical medicine. Such obvious soft-

tissue injuries as nerve and tendon lacerations are usually recognized, and proper surgical treatment is given at the time of the original injury. However, the less obvious and more insidious development of edema, with production of fibrosis, is often neglected and eventually results in disability in spite of excellent bony reduction.

It is my opinion that persistent edema is, at the present time, the most common cause of disabilities that follow fractures. Watson Jones has said, "Edema is glue." This traumatic edema fluid is produced either by the original injury or by mechanical factors following the injury. At the time of the original injury, extravasation of blood into the soft tissues is frequently found. There may also be extravasation of edema fluid into the soft tissues, resulting in so much swelling and interfering with the normal blood supply to such an extent that extensive blisters may form, covering sometimes almost the entire extremity.

This extravasated blood and tissue fluid is removed by one of two methods. If return flow circulation is restored adequately and early, both the blood and edema fluid may be absorbed into the circulation and removed in that manner, with no undesirable after effects. However, if adequate return flow circulation is not established early and if the swelling persists over a period of a week or two, the blood and tissue fluid may be removed by organization instead of absorption, with the eventual production of fibrous scar tissue. This process of organization of hemorrhage and edema fluid in the soft tissues is exactly analogous to and concomitant with the organization which results in the formation of fibrous callus in the process of bone healing.

In ordinary bone healing, the stages are essentially as follows. A hematoma is produced at the time of injury. It then undergoes organization with the formation of fibrous callus, so that, at the end of ten days to two weeks, the fractured bone ends are held in fairly constant apposition, although a roentgenogram will still show no evidence of healing. Later on, calcium is deposited in this fibrous callus, and then calcified callus is present which will show up on a roentgenogram. Still later, the area is invaded by

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blood vessels and osteoblasts and eventually assumes the normal histologic structure of bone. This is exactly the same process that goes on in the soft tissues when hemorrhage and swelling occur in the soft tissues. We speak of this as "myositis ossificans" or as "calcification of a hematoma." However, normal bone structure is almost never attained in the soft tissues. Sometimes, calcification does not occur. This results in what is known as healing by fibrous union.

Since fibrosis is developing between the bone ends and within the soft tissues at exactly the same time, it is obvious that we cannot wait until the bone is healed before attending to the soft tissue damage. There are two apparently antagonistic objectives to be obtained simultaneously. First, the bone ends must be held immobile and in constant apposition until healing occurs. Second, the soft tissues must be kept moving to prevent fibrosis and consequent limited or painful motion. All these factors must be considered in the treatment. Actually, these objectives are not as antagonistic as they appear on the surface. Pressure tends to promote bone healing, so that weight bearing promotes rather than retards healing. Activity not only helps to prevent fibrosis, strengthen muscles, and increase the efficiency of return flow circulation, but it also increases the blood supply to the area so that bone healing is favored. It has been our experience on numerous occasions to have a patient with an ununited fracture referred for treatment because of limited function in the fingers. The surgeon felt that the fingers should be limbered up before doing a bone graft for the nonunion. After a month or two of treatments for the limited motion, it was found that healing had occurred in the area of apparent nonunion, so that the bone graft was no longer necessary.

Nerve and tendon injuries cause complications which require special treatment. If they are completely severed, of course, surgical suture is necessary before any treatment can be carried out. In the case of tendon injuries, measures must be used to prevent the tendon from adhering to surrounding structures and, thus, prevent limitation of function by such adhesions. In the case of nerve injuries, nothing can be done by physical means to hasten the healing process. However, physical measures can be used to keep the muscles in good condition, well nourished, and receptive, so that function will be adequate when and if the nerve regenerates completely and grows down to the muscle. Fractures into joints also present special problems because of the necessity for accurate reduction, particularly if it is a weight-bearing joint, in order to prevent

the later development of traumatic arthritis. Not only may adhesions form within the joint and limit motion, but, also, the amount of muscular tissue is usually rather scanty around joints, with the result that fibrous tissue adhesions due to persistent swelling may cause greater limitation in such areas than in the shaft of the bone. The fibrous tissue capsule of the joint presents another structure that may limit motion if fibrosis is allowed to develop. Thus, it is obvious that fractures into and close to joints are more likely to produce limitation of motion than are fractures in the shafts of long bones. However, in the presence of accurate functional reduction, two factors are necessary to cause limited function even in fractures around joints: immobilization and swelling.

TREATMENT

The care of fractures may similarly be divided into treatment for the bone injury and treatment for the soft tissue injury. The former consists of reduction, either manipulative or operative, and immobilization by casts, splints, traction, or internal fixation. It is essential that an adequate functional reduction be obtained, which does not necessarily mean that an accurate anatomic reduction is required. In certain locations, such as on the weight-bearing surfaces of weight-bearing joints, accurate anatomic reduction is essential. However, in the shaft of long bones, much less accuracy from an anatomic point of view may give just as satisfactory a functional reduction. In fact, sometimes, if the reduction is not too accurate from an anatomic point of view, the healing is faster, the callus more extensive, and the final end result is a stronger union than if accurate reduction had been obtained. The criteria for functional reduction vary with each fracture location, so it is obviously impossible to cover the subject in this type of presentation. The type of immobilization also varies with the location and type of fracture. The principles to be followed are to secure and maintain adequate immobilization of the fracture line continuously until the fracture is healed but to immobilize only those parts which must be immobilized in order to maintain the reduction. All other areas should be given as free motion as is possible and still maintain the reduction. For instance, in a Colles' fracture, the wrist must be immobilized. However, it is not necessary for the fingers, the thumb, or the elbow to be immobilized. Therefore, the cast should be trimmed to the palmar crease, well back around the base of the first metacarpal and far enough distal to the elbow to allow complete flexion and exten-

sion of the elbow. In the case of a fracture of both bones of the forearm, both the wrist and elbow must be immobilized. However, again, it is not necessary to immobilize the fingers or thumb or to keep the shoulder motionless.

Management of the soft tissue injuries may be divided into two stages: (1) treatment of the immediate injury, which is largely intended to reduce swelling and (2) treatment after healing or fibrosis has occurred, which is primarily designed to restore range of motion and strength.

EARLY TREATMENT

Immediately after the reduction has been obtained, steps should be taken to prevent swelling. The most effective, as well as the least expensive, method is the use of active motion immediately after the fracture has been reduced. This procedure should be begun the first day after reduction if possible. The purpose of this exercise is to assist return flow circulation and thereby prevent swelling or to relieve it if it is already present. Normally, return flow circulation is accomplished by muscle activity. The muscle contracts and squeezes down upon the vein. The valves in the vein prevent the blood from flowing distally; therefore, it flows proximally. When the muscle relaxes, the vein fills up from below.

In fractures in which the injured part is necessarily immobilized and muscle spasm may occur because of pain, the above mechanism is decreased in efficiency, so that it is important to pay particular attention to the use of early exercise. However, in order to carry out effective early exercise, the surgeon must often use considerable ingenuity in his choice of an immobilizing apparatus and in trimming the cast so that efficient muscle function is possible. Specific instructions must be given to the patient with the exercises, so that he will start to use the injured part and learn that he can use it in his daily work, or at least, in his daily activities, such as eating, dressing, and so forth. If such exercises can be begun early, swelling will not develop sufficiently to interfere with function in a great majority of cases, and these exercises may be the only type of physical treatment needed.

If active exercise is not possible, the next most effective method for reducing swelling is by adequate elevation. If the lower extremity is affected, the patient must be in bed with the extremity elevated above body level, so that the position from the toes to the hip and from the hip to the heart is progressively downward. In the upper extremity, the elevation must be the same way with the fingers above the wrist, the wrist above the elbow, the elbow above the

shoulder, and the shoulder above the heart. Again, for elevation to be effective, the patient must be in bed. A sling does not provide a downgrade from elbow to shoulder.

If neither active motion nor elevation is effective, other physical measures may be used, such as the application of some form of heat to relieve pain and increase the arterial blood supply to the affected parts. It should be remembered, however, that heat alone does not reduce swelling. In fact, if the heat is effective, swelling increases because heat causes an increase in arterial circulation greater than the increase in venous circulation. Therefore, the capillary pressure is increased and the fluid tends to exude from the capillaries into the tissues rather than from the tissues into the capillaries, which is the actual objective of treatment. Heat may be applied in the form of infrared radiation, hot packs, or, occasionally, hot soaks if it can be done without displacing the fractured fragments.

Heat should always be followed by massage or exercise or both in order to accomplish the primary purpose, which is to remove the swelling. Stroking massage, with the force of the stroke toward the body, is most effective early in fractures. This type assists return flow circulation. The massage should be mild so that pain is relieved instead of increased. Violent manipulation or painful types of massage should be avoided. If at all possible, the heat and massage should be followed by active exercise. It may be necessary in many instances for the therapist to assist the patient in carrying out the motion by overcoming gravity for him or by supporting a part of his body. However, passive motion should never be used early in fractures because the patient is apprehensive and tends to resist any passive motion made by the therapist. Therefore, the so-called passive motion is transformed into resistive motion, with the patient doing the resisting. Such action is likely to displace the fragments and, therefore, is definitely contraindicated. Assisted active exercise is the exercise of choice in early fractures. During immobilization of the fracture then, the objective of treatment is primarily to reduce swelling as soon as possible and, second, to maintain range of joint motion, muscular strength, and dexterity.

TREATMENT IN THE LATE STAGE

If treatment is delayed until the bone has healed, soft tissue adhesions will have formed and may have become firm and solid. Under these conditions, the treatment varies greatly from that in the early stage. At this time, the objectives of treatment are: (1) to soften and stretch fibrous

tissue, (2) to increase range of joint motion, (3) to restore circulatory efficiency, (4) to increase muscular strength, and (5) to retrain muscular dexterity.

Heat is used for sedation and to increase circulation and for its tendency to soften fibrous adhesions. The type of heat used varies greatly, depending upon the availability of treatment and the pathologic condition present in the patient. In our experience, the best relaxation is usually obtained by moist heat. The whirlpool bath is especially valuable because heat, massage, and active motion may be obtained simultaneously. Hot packs are frequently useful, particularly in areas which cannot be reached easily in the whirlpool. Diathermy and short-wave diathermy may be used at this stage. Infrared radiation is not as effective during the late stage as in the early stage.

The heat is followed by massage with emphasis upon deep stroking and compression movements, such as kneading, pétrissage, and deep friction. The treatment may be considerably more vigorous than in the early stage. However, the production of muscle spasm still defeats the purpose of the massage, so that skill is required and rough treatment is contraindicated. Swelling, which is often present at this stage as well as in the early stage, is aided by stroking massage with the force in a centripetal direction, thus aiding return flow circulation and decreasing the swelling. Tender areas are made less tender by massage. The intramuscular movement produced by kneading and friction aid in stretching the adhesions, so that a greater range of motion is obtainable.

Heat and massage should always be followed by exercise. The type of exercise depends upon the results and physiologic effects desired. Assisted active motion, free motion, and resisted active exercises may be used progressively as the patient improves. High resistance, low repetition exercises tend to increase muscle strength while low resistance, high repetition exercises tend to develop endurance and skill. Forced stretching may be necessary in the late stage in order to obtain a maximal range of joint motion. However, I believe that it should be used only as a last resort, and it is extremely important not to overdo forced stretching. It is usually best to stretch without anesthesia, attempting to obtain a small increase in range of motion at each session and repeating the treatment frequently, usually daily or every other day. Occasionally, this method is not successful and anesthesia, with forced stretching of the adhesions, may be necessary to obtain a satisfactory range of motion. If

stretching under anesthesia is used, it should be followed immediately by measures to combat pain and maintain the range of motion obtained by the manipulation. If adhesions are torn and the affected part is allowed to remain in a contracted position because of pain, both the torn ends may fasten to structures which will then be held by adhesions stronger than before.

OCCUPATIONAL THERAPY

The procedures and principles of physical and occupational therapy entwine to such an extent that there can be no absolute dividing line between them. Physical therapy may relieve pain and obtain range of motion and by stipulated exercises may strengthen muscles. Occupational therapy accomplishes these same objectives and, in addition, provides a stimulus or an objective toward which the patient can work. It is the logical link between physical therapy and return to working conditions. Recreational occupational therapy may be used if the patient is confined to bed for long periods of time. However, in most fractures, recreational occupational therapy has only a very limited usefulness. On the other hand, functional occupational therapy is extremely useful in the treatment of fractures. The use of carpentry to strengthen muscles and mobilize joints, even when the tools have to be modified to allow treatment of the involved parts, gives the patient a concrete goal to strive for in the completion of the article he is making. This provides a stimulus for long-continued exercise, which is not present if the exercise is done for no apparent reason. The occupational therapist must exercise a good deal of originality in devising measures to be used for specific therapeutic purposes which will accomplish the desired physical result and, at the same time, hold the patient's interest for long periods of time. For instance, if the thumb and fingers are involved, flexion may be obtained by clay modeling, carpentry with hand tools, radio and electrical construction, flytying, typesetting, or embossing; extension is achieved by pottery making (coil method) or by refinishing furniture, weaving, inverted loom weaving, folding paper stock, piano playing, typing, or gardening; abduction is obtained by playing the piano, typing, or card weaving; opposition is accomplished by cord knotting, radio repair work, typesetting, leather tooling, flytying, gardening, leather plaiting, cutting with shears, leather punching, feeding a printing press, or embossing; adduction is attained by piano playing, typing, typesetting, radio and electrical construction, leather tooling, or embossing. The proper combination of

motions must be selected and applied in the patient's individual project. These same principles apply to all portions of the body, and charts are available for assistance in choosing the proper projects.

REHABILITATION

The total rehabilitation of the fracture patient depends upon the application of the foregoing principles in a comprehensive program designed to restore him to the highest physical, social, and economic level that is possible under the limitations imposed by his handicap. This process begins when his injury is first treated and should be kept in mind throughout his course of recovery. It requires frequent re-examination with variations in treatment to meet the changing physical, mental, and emotional problems that arise during the course of recovery. Close medical supervision is necessary. Such decisions should not be left to the discretion of the physical or occupational therapist.

If a change of occupation will be necessary, it should be determined as early as possible and the exercise and occupational therapy should be designed to assist the patient in learning and performing his new duties, so that he will be ready for employment at the earliest possible moment after treatment is completed.

However, it is rarely necessary to change occupation following a fracture, so the usual program involves determining the amount of strength or skill and the range of joint motion that will be required for the patient to return to his usual employment and then setting up an adequate exercise and occupational therapy program. A three- to six-hour treatment day combining physical therapy, occupational therapy, group exercise, games, recreation, and prevocational training seems the most efficient way to rehabilitate the injured person.

Fractures in the following locations present individual problems which deserve special consideration.

1. *Shoulder joint.* Because the shoulder motion is complex, consisting of scapular motion upon the thorax as well as motion at the scapulohumeral joint, shortening of the fibrous tissue of the scapulohumeral joint capsule or adhesions from the scapula to the humerus presents a difficult problem. Active exercise is not efficient in this instance because the patient himself cannot separate scapulohumeral from scapular motion, and he tends to elevate the scapula instead of abducting the arm. In order to mobilize the scapulohumeral joint itself, another person must stabilize the scapula while the motion is performed.

This cannot be done by a member of the family in most instances, because it is extremely difficult to teach an untrained person the exact motions to avoid. It is usually necessary for treatment to be given in the physical therapy department, so that the scapula can be held immobile while the patient or the therapist carries out scapulohumeral motion. Once the range of scapulohumeral motion has reached 65 to 70°, the patient may then be instructed in home exercises with some hope of success. However, if the range is less than 45 to 55°, it is almost impossible for him to carry out adequate shoulder joint motion. I think this is one reason why manipulation of the shoulder under anesthesia has been a relatively successful procedure; whereas, manipulation in other areas is usually not successful.

2. *Elbow.* The elbow is a triple joint consisting of the humeroulnar, the humeroradial, and the proximal radioulnar articulations. The articular surfaces fit very snugly into each other and are firmly held by powerful ligaments without allowing any side motion. It is a true hinge movement which is guided and limited by the configuration of the bones. The extremes of motion are limited by the depth of the olecranon fossa posteriorly and the coronoid fossa anteriorly. Any interference with these fossae will cause limitation of the extremes of flexion or extension. Rotation of the forearm is permitted by the radioulnar joint.

From the functional point of view, it is important to realize that because these motions are rigidly controlled by the contour of the joint surfaces and by firm ligaments, no leeway allowance is left for poor reductions. Minimal adhesions result in maximal disabilities.

Elbows are notorious for poor functional results. A few of the reasons for limited motion are:

a. Poor reductions; these are especially likely to occur in this area because minor displacement may result in major disability.

b. Healing by callus formation may occur in the fossae and, thus, limit motion by mechanical interference. This condition cannot be overcome by physical therapy. However, prolonged use of the injured part will usually increase the range of motion. It may take six months or more for the callus to absorb enough to allow normal extension even if the reduction is perfect. Repeated attempts at reduction may cause so much trauma that range of motion becomes more limited.

c. Myositis ossificans occurs fairly commonly in the elbow and may be a cause of considerable disability. Our treatment for myositis ossificans

has consisted of immobilization accompanied by daily long-continued short-wave diathermy or other methods that increase circulation and absorb the calcium.

d. Adhesions are common, particularly if trauma has been severe, either from the original injury or from repeated attempts at reduction.

e. Forced motion. Forcible manipulation of the elbow joint, with or without anesthesia, is contraindicated in nearly every instance. Increase of trauma and hemorrhage and decrease of function are the usual result. We have a dictum which we emphasize at every possible opportunity. This is "*Never force an elbow joint.*"

The following principles are applicable to the management of elbow joint fractures. First, the treatment should be started as early as possible without interfering with the reduction. Guarded active motion is started at the end of ten days to two weeks or even earlier if internal fixation has been performed.

Second, the treatment must not cause pain at any time. We find that the whirlpool bath is usually quite satisfactory because muscles become relaxed, pain is relieved, and active motion can be carried out in the whirlpool with minimal fear on the part of the patient.

Third, swelling should be promptly treated by elevation, release of tight bandages, and active motion of the fingers. It is often advisable to elevate the arm with the patient hospitalized in bed if swelling is very severe immediately after reduction.

Fourth, the exercises should be entirely active, and it is important to produce active extension of the elbow as well as active flexion of the elbow. I am not in favor of carrying pails of sand or using a weighted lead cuff because these aids usually are not efficient and, if they do accomplish a change in the range of motion, the change is generally merely in the location of range of motion rather than in increase in the total range.

Fifth, roentgenograms are checked frequently to be sure position is maintained, to follow the progress of the union, to determine whether limited function is due to excess callus, and to reveal the presence of myositis ossificans or other complications.

Sixth, nothing is gained by continuing treatment indefinitely. If improvement stops and motion remains stationary for several weeks, careful examination should be made and the cause diagnosed. If no condition can be found that needs attention, the treatment should be discontinued and the patient followed with accurate measurements of range of motion. Sometimes, the patient has been overtreated inadver-

tently, and improvement occurs when this is stopped or decreased.

Seventh, again I repeat, "*Never force an elbow joint!*" Forced motion causes more trauma and pain, limits motion, and tends to retard the recovery of function.

3. *Wrist.* Colles' fractures are commonly regarded as rather minor fractures, but they can cause major disabilities. Sudeck's acute post-traumatic bone atrophy is commonly found in this location. The reduction must be adequate, the wrist must not be kept in too flexed a position because of the danger of severe residual disability, particularly in elderly people. If the patient does not begin to carry out active motion right after the injury or if painful swelling occurs, it is extremely important to see that all possible measures are taken to avoid continued painful swelling and immobilization.

In carrying out finger exercises, it is important that the patient realize there are three joints, each of which must be moved through a full range in order to prevent stiffness and disability.

4. *Ankle.* Fractures of the ankle may be one of three types. The first is a fracture of the lateral malleolus, which is a fairly minor injury and is usually not displaced and rarely requires reduction if it is displaced. A walking cast may be used right after the injury and recovery is usually complete without complications.

Second is a fracture of the lateral and medial malleoli. In some of these, the foot may be displaced, usually toward the lateral side. If the medial malleolus is broken off flush with the ankle joint itself, there may be considerable difficulty in reducing this fracture and in maintaining reduction. However, if the medial malleolus is below the level of the ankle joint, reduction is accomplished and maintained much more easily because there is something to press the talus against. Again, this type of fracture is suitable for a walking cast in most instances. Nevertheless, in some cases, it may be dangerous to apply a walking cast in the early stages, but it may be applied after fibrous union has occurred. In an occasional instance, it is necessary to insert a screw into the medial malleolus or to apply some other type of internal fixation. This type of injury may result in further disability and frequently requires treatment in the physical medicine department, which usually consists of whirlpool baths, massage, and strengthening exercises.

The third type of fracture is a trimalleolar fracture in which the medial and lateral malleoli and the posterior lip of the tibia are all fractured. This is often accompanied by severe displacement so that the foot is completely off the leg.

If the fracture of the posterior lip does not involve more than the posterior third of the lip, it may be treated exactly as a bimalleolar fracture. However, if the posterior lip fracture is farther forward than that, reduction must be absolutely accurate because the slightest degree of offset causes traumatic arthritis and permanent, painful disability. Many of these cases require open reduction in order that the fracture line may be perfectly reduced. The difficulty with this type of injury is that the reduction looks so much better than the original that frequently the surgeon is satisfied with a reduction that is less than perfect. This is a tragic mistake. In this type of fracture, a walking cast should be delayed at least until healing is progressing well.

With all ankle fractures, tightness in the gastrocnemius-soleus muscles tends to develop. This is the result of a plantar flexed, or slightly plantar flexed, position in the cast. If this condition occurs, the patient tends to externally rotate the lower extremity so that he does not need to use ankle joint motion. He can walk this way just as though he were still on a walking heel on a cast. This is a very common cause of limp and poor gait following an ankle fracture.

The objective of treatment is to overcome the shortened Achilles tendon and then to teach the patient to walk with his foot straight ahead, come down on the heel, rock forward on the ball of the foot, and lift the heel off the floor in a normal manner.

5. *Volkman's ischemic contracture.* Volkman's contracture may occur after fractures in the supracondylar area of the humerus and, occasionally, after fractures of both bones of the forearm. It is usually manifested by severe pain quite early after the reduction. It is considered to be due to hemorrhage under the fascia of the

muscles and, as such, is not specifically a nerve injury, although paralysis of the nerves usually follows.

It is extremely important to instruct the intern on the fracture service never to give a sedative to a patient who complains of pain after a fracture until that part has been examined. If a Volkman's contracture is developing, it must be treated within the first six hours. Treatment in the acute stage consists of incisions through the fascia in order to decompress the hemorrhage.

A common attitude is to consider a well-developed Volkman's contracture a hopeless situation, and some authorities state that the best that can be done is to make an automatic grasping hand; that is, by shortening the flexors of the fingers, dorsiflexion of the wrist will give some degree of grasp but no control. I do not agree with this opinion, however, because I have found that by treating these contractures intensively over a long period of time, the fibrotic flexor muscles can be stretched enough to provide a fair grasp and many patients recover sensation. Thus, a hand that looked hopeless becomes one in which there is adequate circulation and nearly normal strength. The main residual is the somewhat shortened flexor muscles. This result is achieved by applying a pancake splint with a malleable wrist to which the hand is fastened in a flexed position and the fingers are extended as much as possible. Then treatment is given daily, or more than once daily if possible, consisting primarily of whirlpool baths and gradual stretch. As length is gained, the wrist is further extended. Most of these patients can eventually move their wrists beyond the straight line. I have followed one such patient for twenty years, and this patient still has adequate, though limited, function.

Practical Problems of Newborn and Premature Care

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NEWBORN AND PREMATURE INFANTS depend for their care on the physician and the quality of the nursery. It is the physician's responsibility, as he tries to provide the best possible care, to teach the nursery personnel and to set and enforce standards of nursery care. It is in such efforts that a physician, particularly a pediatrician, can contribute much to make the newborn period safe.

For good newborn and premature care, the physician must rely almost entirely upon a good nursing staff. The early diagnosis of many major diseases of the newborn depends upon the early recognition of some sign or symptom which the nurse reports to the physician. To perform this duty well, a nurse must have special training.

It should be a pediatrician's responsibility to set up a thorough teaching program which will reach every nurse who handles newborns. This can be achieved by a series of conferences discussing a recent patient or some pediatric problem. In time, every aspect of newborn care should be discussed. Such an approach results in new interest and, eventually, in better care.

Short-term training courses for nurses, mainly in premature care, are available in several pediatric centers. It is well worthwhile to make use of these courses, because they tend to transfer the responsibility of maintaining standards in the nursery from the physician to the nurse.

There is always the difficulty of finding enough nurses to staff nurseries. The pediatrician must emphasize the fact that premature and newborn infants should never be left unattended. Prematures are particularly apt to have sudden attacks of apnea. This occurrence alone is reason enough to have a nurse experienced with newborn infants on duty twenty-four hours a day. Because of the shortage of trained personnel, it is a common practice to prop bottles at night for infant feeding. Obviously, this is not a safe practice. Nurses are not needed to feed normal babies. Any nurse's aid or practical nurse can

do this and other routine duties. Weighing infants, changing diapers, and carrying babies, as well as much of the clerical work and telephoning should be done by nonprofessional help. The primary responsibilities of the nursery nurse should be to familiarize herself with the condition and problems of each baby, to inspect each child daily, to report to the attending physician, and to help with procedures. She should have leisure to advise and help the nursing mother.

A major danger to the newborn stems from staphylococcal infections. A recent epidemic in Minneapolis has been studied and reported.¹ Only with well-trained personnel and an adequate staff can an infant be reasonably well protected. The recommendations of the Minnesota Department of Health² and the American Academy of Pediatrics³ should be followed.

Personnel with sore throats or colds must be kept out of the nursery. Wearing masks for "just a little cold" cannot be tolerated. The nursing personnel should not wear masks, since masks become a source of contamination after they have been worn twenty to thirty minutes. However, use of masks can well be recommended for the many persons who enter the nursery for short periods of time, such as an examining physician.⁴

Routine bacterial cultures should be taken regularly from areas most likely to show contamination, such as the water from bottle warmers, water in containers in incubators, hand lotion, cribs, scales, and counters. Only two or three cultures need to be sent each week, but these should be taken from different areas. If hemolytic staphylococci, beta hemolytic streptococci, or other pathogens should appear, more cultures must be taken and an effort made to find the source and to eliminate the organism.

There is some difference of opinion concerning the necessity for the common examining table. Many physicians feel that it is more difficult to examine the baby in his crib and that the common examining surface is hardly a factor in transmission of disease. Yet, stools soak through the paper placed on the examining surface. Should pathogens, such as staphylococci,

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certain strains of *Escherichia coli*, or *Salmonella*, be present, the danger of contamination would be real. Clement A. Smith states: "We have

given up all central 'treatment' or 'examination' tables. Examination is done in the infant's bassinets or incubator — treatments are carried out

TABLE 1
FAIRVIEW HOSPITAL
NEW BORN RECORD

BABY		GIRL		BOY		RACE		HOSPITAL NO.		ROOM NO.																											
MOTHER'S NAME						DOCTOR																															
Date																																					
Age in Days																																					
Hour		12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8	12	4	8
TEMPERATURE	105																																				
	104																																				
	103																																				
	102																																				
	101																																				
	100																																				
	99																																				
	98																																				
	97																																				
	96																																				
REMARKS	Routine AM Care																																				
	Condition on transfer to Nursery Nurse Time Admission Care By																																				
WEIGHT	Birth Weight																																				
	Length																																				
	Head																																				
	Chest																																				
FEEDINGS	Breast Milk	5 oz.																																			
	Blue	4 oz.																																			
	Formula	3 oz.																																			
	Red	2 oz.																																			
	Water or Glucose	1 oz.																																			
STOOLS																																					

P.O.M. 120

newborns into one "Admission Nursery," mainly to facilitate observation during the first few hours. After twenty-four hours, the newborn is

It is a common procedure to admit all the

newborns into one "Admission Nursery," mainly to facilitate observation during the first few hours. After twenty-four hours, the newborn is

TABLE 2

Maternal History Total No. of Preg. _____ Born Alive _____ Now Living _____ Mothers Age _____

Blood and Rh Type _____ Maternal Disease _____

Complications of this Preg. _____

Delivery: Duration of Gestation _____ Weeks. Length of Labor: 1st _____ 2nd _____ Stage _____

Position _____ Type of Delivery: Spontaneous _____ Forceps _____ Cesarean Section _____

Complications _____

Infant: Time _____ A.M. Eyes Crede _____ Identified _____ Oxygen _____ Min. Color _____
P.M.

Breathing: Spontaneous _____ With Stimulation _____ Type of Stim. _____

Abnormality or Injury _____

Remarks _____

PHYSICIANS RECORD

[illegible][illegible]

then moved to a different nursery. Should one infant have an infection, at least two and probably all nurseries will have been contaminated.

Good newborn care is reflected in a good chart. It must contain all information that is vital for the child, such as the Rh and blood type and complications of pregnancy or delivery. In cases of neonatal apnea, the nurse's record must begin at birth, not when the child finally reaches the newborn nursery. Forms for a newborn chart have been outlined by a committee of the Academy of Pediatrics; however, these records cover five pages.³ With the help of many nursing supervisors of different hospitals, we have arranged the information on one sheet, which is now used with modifications in three Minneapolis hospitals (tables 1 and 2). In case of disease, the hospital's regular forms for nurses' notes, consultation, progress notes, and laboratory sheets are added.

Increased concentrations of oxygen and humidity, so commonly prescribed, present several problems. Limiting or measuring devices for oxygen must be provided to protect the premature infant from retrolental fibroplasia. Even though high humidity and mist may not offer advantages over ordinary conditions, they are now commonly used.⁶ Oxygen is a drying agent, and it does not seem rational to expose the respiratory tree to such drying action. Whenever oxygen is used, it should be efficiently humidified. Oxygen given by funnel in front of the child's face is not well humidified, even if bub-

bled first through a water bottle. In most incubators, satisfactory humidity can be provided only by blowing oxygen or air through a humidifying device. If a small infant does not need additional oxygen, the humidifying device should be run with compressed air. In the construction of new premature nurseries in which piped-in oxygen is provided, thought should be given to provision of piped-in compressed air. Compressed air can easily be obtained from tanks or portable compressors, but this procedure is space consuming and cumbersome.

At this date, the care of newborn and premature infants does not make great demands on the laboratory. There is one procedure, however, that should be available in any hospital caring for newborns and that is serum bilirubin determinations from a heel puncture. Repeatedly drawing blood from the newborn or premature baby is not practical. Occasionally, an exchange transfusion may not be necessary if the bilirubin level can satisfactorily be followed.

After a newborn infant has had surgery, he is usually transferred to the pediatric service. A newborn on that service deserves the same kind of protection he receives in the newborn nursery. Techniques pertaining to masks, gowns, gloves, hand washing, isolation, and visitors should be similar to those of the nursery. Postoperative colds and diarrhea are common enough for the pediatrician to insist on a simple, common sense, but strictly enforced, isolation procedure.

Feeding the healthy term infant has become

TABLE 3
PREMATURE FEEDING SCHEDULE

It is important to realize that this schedule must be adjusted to the need and tolerance of each infant. Many babies can be fed more. All feedings are given every three hours. Amounts are in cubic centimeters per feeding.

Age	750 to 1000	1000 to 1250	1250 to 1500	1500 to 1750	1750 to 2000	2000 to 2250	2250 to 2500
0 to 24	0	0	0	0	0	0	0
24 to 36	0	0	8 G	8 G	10 G	10 G	15 G
36 to 48	4 G	8 G	6 G, 4 F	8 G, 4 F	10 G, 5 F	10 G, 10 F	15 G, 15 F
3	4 G, 4 F	6 G, 6 F	6 G, 8 F	8 G, 8 F	10 G, 10 F	10 G, 15 F	15 W, 20 F
4	4 G, 6 F	6 G, 8 F	6 G, 10 F	8 W, 12 F	10 W, 15 F	10 W, 20 F	15 W, 30 F
5	4 G, 8 F	6 W, 14 F	6 W, 14 F	8 W, 16 F	10 W, 20 F	10 W, 25 F	10 W, 35 F
6	4 W, 10 F	6 W, 14 F	6 W, 18 F	4 W, 20 F	5 W, 25 F	5 W, 35 F	45 F
7	4 W, 12 F	4 W, 16 F	4 W, 22 F	4 W, 24 F	5 W, 30 F	40 F	45 F
8	2 W, 14 F	20 F	26 F	30 F	35 F	40 F	50 F
9	16 F	22 F	28 F	32 F	35 F	45 F	50 F
10	18 F	22 F	30 F	34 F	40 F	45 F	55 F
11	18 F	24 F	32 F	36 F	40 F	50 F	60 F
12	18 F	24 F	34 F	40 F	45 F		
13	20 F	25 F	35 F				
14	20 F						

After end of schedule is reached, increase by about 5 cc. per three hour feeding for each ½ lb. of gain.

F = Formula (20 calories per ounce)
G = 5% glucose in water
W = Water

extremely simple, yet many of our nurseries are burdened with a multitude of different formulas. Some of these differ more in name than in composition. The preparation of these different formulas, storing them, and finding them for each infant at each feeding time represent work that can be far more profitably spent. To have all or almost all normal newborns on the same formula greatly simplifies the nursing care. A house formula has the disadvantage of advertising one brand at the expense of all others. If the proprietary formulas are rotated, the physician is still confronted with mothers who request the formula that happens to be the choice at a particular hospital.

For the past three years, we have been using at Fairview Hospital in Minneapolis a simple formula of $\frac{1}{2}$ evaporated milk, $\frac{1}{2}$ water, with 5 per cent granulated sugar, amounting to 20 calories per ounce. The evaporated milk is bought on bid or rotation. Except for the fact that evaporated milk is used, no brand of milk or milk modifier is advertised. When each baby goes home, the nurse takes from a file card the formula the physician has chosen. If the mother asks what formula her baby is receiving, she is told in general terms that it is very much like that which her baby will be given at home. Our medical staff, except for one or two physicians, has readily accepted this program, and it has done much to smooth nursery procedures.

When a routine formula is used in two different dilutions, a newborn can stay too easily on the weaker formula when he should be on the stronger one. A 3-oz. feeding every four hours of 1:2 instead of 1:1 dilution of one of the customary formulas provides barely enough calories for a 5-lb. baby and is obviously inadequate for the average term infant. We like to keep all our formulas for normal infants or prematures at 20

calories per ounce and offer additional water. This again simplifies the preparation of the formula and avoids error.

If the breast-fed baby is given complement feedings at all, the amounts are strictly limited in order to help make breast feeding a success. The nursery routine suggests a bottle feeding at 2:00 A.M. of not more than 2 oz. and water complements given during the day.

Overfeeding the small premature is a common occurrence. The amount of the feeding should be ordered by a physician. Too often, however, the nurse is responsible for the amounts that are fed. For such cases, the nurses were provided with a feeding schedule (table 3).

SUMMARY

A few of the problems of good newborn care have been presented. As long as one encounters nurseries without a nurse in sight, personnel wearing masks for "just a little cold," and infants fed by bottles that have been propped up, our newborn nurseries are not meeting minimum standards. To achieve the best possible care for the newborn infant, the physician must not only concern himself with the medical challenges of newborn care but must show an active interest in the practical problems of the newborn and premature nurseries.

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Influenza

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INFLUENZA is an acute, infectious respiratory disease of epidemic nature. It is variable in extent and severity and characterized by fever of sudden onset, often with a chill accompanied by headache, pain in the back and limbs, pronounced prostration, and, usually, inflammation of the respiratory tract. It is of short duration, lasting one to four days, but weakness far out of proportion to the illness may persist for some time.

ETIOLOGY

Prior to discovery of the viruses which have been demonstrated to be the cause of the recent epidemics, there was much speculation regarding the etiology of influenza. In 1890, Pfeiffer believed that a bacillus, which he designated *Hemophilus influenzae*, was the cause. In 1918, however, many other bacteria were also found in the lungs of fatal cases, and many then assumed that an unrecognized virus was the primary cause of the disease and that the bacterial component was a secondary invader.

In England, in 1933, Smith, Andrews, and Laidlaw isolated a virus from throat garglings of patients with influenza. Thereafter, numerous investigators confirmed this observation. The viruses discovered in 1933 were designated as type A. In 1940, Francis N. Magill independently reported the isolation of a new virus during an influenza epidemic in 1940. This was designated as influenza B virus. There are now 3 immunologically distinct types of influenza viruses that have been identified—A, B, and C—and, within type A, are some 4 serologically intersecting groups of type A strains. Each has been successively responsible for type A influenza for a period of years. In the United States during the period 1933 to 1943, studies revealed

6 definite epidemics of influenza A. In 1947, A-prime viruses completely replaced the earlier groups, and the etiologic agents of influenza A have been variants within the A-prime set during the last ten years on a world-wide basis. In May 1957, a new strain of A-prime, known popularly as the Asian strain or Asiatic flu virus, was isolated and has been found to be responsible for the influenza epidemic of 1957.

The types A and B influenza viruses are antigenically distinct. Among different strains within each type are demonstrable differences in antigenic structure. In addition to differences in antigenic composition, strains of viruses appear to vary in their pathogenicity. Both types of viruses are infectious for ferrets and mice and can be grown readily in the chick embryo. The latter has proved a valuable laboratory aid. Viruses in human throat washings can be cultivated in fertile eggs. Moreover, the presence of a virus in a developing chick can be recognized by its capacity to agglutinate the erythrocytes of various animal species. This red-cell agglutination phenomenon described by Hirst and by McClelland and Hare has provided the basis for the development of simple laboratory methods for diagnosis. The fact that a specific antibody will inhibit the agglutinating effect of a certain strain of virus has been utilized to devise a useful serologic test. By means of this test, a diagnosis of influenza A or B can be made by demonstrating in convalescence a rise of antibody titer to the viruses of one type and not the other.

EPIDEMIOLOGY

Influenza diseases are world-wide in distribution, occurring as pandemics at irregular intervals. The most devastating occurrence was the great epidemic of 1918 and 1919. In a period of a few months, 20,000,000 people died, 540,000 in the United States alone. There have been 17

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epidemics since 1918 to 1947. Observation of these epidemics suggests that epidemics of influenza A tend to recur during the winter months at intervals of two to three years, and epidemics of influenza B recur during the winter or early spring and at intervals of four to six years. This does not mean that the disease does not occur in periods between epidemics, for it has been found that sporadic cases and localized outbreaks do occur in the interepidemic periods and at all seasons of the year. Thus, it seems that the viruses of influenza A and B are in constant circulation in the human population and periodically each erupts as the cause of an epidemic over greater or lesser areas of the earth.

The new Asian variant of type A influenza made its first appearance in China late in February 1957 and had spread through eastern Asia and the Middle East by June, including South America and Africa in July and August and reaching the European and North American countries in September and October. By early in the month of December, it had essentially completed its world-wide sweep, even involving Antarctica.

Despite quantitative differences in geographic distribution, incidence, severity, complications, and mortality, the epidemics of known cause are similar with respect to certain basic features. The incubation period is very short and varies from one to three days. The infectious agents are present in the secretion of the respiratory tract and are transmitted directly from human being to human being via droplets of these secretions or are air-borne over short distances. Communicability probably begins before the onset of symptoms, and the infectious period continues as long as the virus is present in the respiratory tract secretions. Viruses have been obtained from throat garglings as long as seven days after onset of symptoms.

IMMUNITY

Regarding immunity, influenza A and influenza B behave as different diseases. Antibodies of one will not protect an individual from the other. The titer of serum antibody begins to rise about seven to eight days after the onset of illness and reaches the maximum level in about two to three weeks, after which it begins to decline at a slow rate. The presence of demonstrable antibody in the serum is not synonymous with immunity, though individuals with higher levels of antibody are less susceptible to infections. The immunity resulting from natural immunity is not very long, for influenza A epidemics may strike an individual within a two-year period.

PATHOLOGY

Death in the uncomplicated case is very rare. So little is known about the pathologic changes induced in man by influenza virus infection. In experimental animals, the mucosa of the nose, trachea, and bronchi is destroyed, and an interstitial pneumonia is often found. In human beings, pathologic findings vary with the type of secondary invading bacteria. In recent years, *Staphylococcus aureus* has been the chief offender.

CLINICAL PICTURE

Wide variation may exist from epidemic to epidemic and from individual to individual. However, there are certain features in common. The incubation period is very short—one to three days. The onset is sudden; often the exact hour that the symptoms began can be recalled. Symptoms of fatigue, chills, and headache and aching in the back and extremities usually occur. A hacking cough is almost always present. If fever develops, it usually rises as high as 103 to 104° F. during the first day. Prostration is often greater than that indicated by the degree of fever. Occasionally, nausea and vomiting occur, but diarrhea is not part of the clinical picture.

Physical examination reveals few findings. The absence of signs that might explain the fever often suggests the diagnosis. The pharynx may look entirely normal or may be injected slightly. There is no exudate. In the majority of cases, the lungs are clear, but, in a small number, a few crackling rales are audible in small areas. Muscle tenderness and occasional ocular tenderness are present. The white count may be elevated early but is usually low through most of the illness.

Complications are frequent, and an associated or subsequent bacterial infection may involve any portion of the respiratory tract, such as sinusitis, otitis media, or tracheobronchitis. The most serious sequela of influenza virus infection is pneumonia. At times, it may be so fulminating that death occurs in a matter of hours, though, in most cases, the pneumonia arises three days to as long as ten days after the onset of influenza.

TREATMENT

Treatment is primarily supportive, and measures may be taken to make the patient more comfortable until the disease has run its course. Antibiotics are useful only in treating cases which have become complicated by secondary bacterial invaders. The fact that mortality was

very low in the recent epidemic might very well have been the result of the liberal use of antibiotics.

PREVENTION

Vaccination has been found to be effective in reducing the incidence and severity of the disease during epidemics of both influenza A and influenza B. In studies conducted by the United States Army in 1943 and 1944 involving 12,500 men in which one-half of the men received a single inoculation of the virus vaccine and the other one-half a control injection, it was found that typical influenza developed in 7.1 per cent of the unvaccinated and 2.2 per cent of the vaccinated individuals. Other studies revealed comparable results. With the recent Asiatic flu epi-

demie, vaccination was thought to have had an efficacy of approximately 70 per cent.

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By infusing HYDROCHLORIC ACID into the gullet for thirty minutes, esophagel and cardiac pain may be differentiated. The esophageal origin of symptoms may be demonstrated regardless of whether lesions are apparent endoscopically.

A plastic tube is inserted through the nose into the stomach to aspirate gastric contents and then withdrawn so that the tip is 30 to 35 cm. from the nares. The tube should be connected to the test solutions behind the patient so that he will not be aware of changes in solution. Initially, 0.9 per cent sodium chloride is administered for fifteen to thirty minutes at a rate of 100 to 120 drops per minute. One-tenth normal hydrochloric acid is then infused at the same rate for thirty minutes or until severe or typical discomfort is elicited. If the esophagus is the origin of symptoms, characteristic pain, burning, and associated manifestations are reproduced.

Since the acid enters the stomach, induced symptoms of gastroduodenal and esophageal origins must be distinguished. The gullet is implicated if symptoms are distributed above the xiphoid and disappear rapidly when perfusion is stopped or antacids are given. If pain persists for an hour or more in spite of cessation of acid administration or ingestion of antacids or if no symptoms are above the xiphoid, acid should be introduced through a tube placed in the stomach. If pain does not occur but a repeat esophageal test immediately after or on the next day elicits symptoms, discomfort of esophageal origin is accepted.

LIONEL M. BERNSTEIN, M.D., and LYLE A. BAKER, M.D., Veterans Administration Hospital, Illinois. *Gastroenterology* 34:760, 1958.

Drug-Induced Depression

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A DISCUSSION OF drug-induced depression covering the multitude of drugs and drug combinations that may or may not cause or precipitate a depressive state would be enormous. This paper will attempt to project some observations on the subject.

The often unsatisfactory results of therapy in the treatment of mild anxiety states, mild psychoses, chronic tension states with chronic headache, hypertension-tension-anxiety states, and depressive states have led to a number of new drugs. Many have been helpful to us in practice, while others have been discarded.

Perhaps some of the unsatisfactory results produced by these new drugs have been due to the physician's misunderstanding about a few basic rules of pharmacology. Basically, the prescriber of any drug must consider the action of the drug, the method of administration, the timing, the dosage, and, above all, the tolerance of the patient. Likewise, the emotional effect that the administration of any particular drug might create and the purpose for which it is prescribed must be kept in mind.

The interpersonal relationship between physician and patient, particularly in an already somewhat disturbed patient, is an important factor in the over-all response to the drug prescribed regardless of the drug's clinically proved pharmacologic action. In some instances, the drug is the most insignificant factor in the production of the desired pharmacologic response.

Refinements in psychiatry and in medicine in general in the past fifteen to twenty-five years have aided the nonpsychiatrist in screening symptoms of emotional origin. Progress in pharmacologic research and improvements in methods of extraction, purification, and combinations of drugs have also improved.

In the past five years or more, a few thousand reports have been noted in the literature to attest to the use, abuse, and results of the newer group

of drugs called "tranquilizers." Even the philosophy of the use of these drugs has been discussed by churches and by physicians. I am certain that the same fears and alarms were expressed when the barbiturates were introduced.

Unquestionably, patients who seek the aid of their physicians for nervous discomfort, or the milder forms of emotional disturbances, do so because they are unable to cope with the problems at home or at work. Whether true or imagined, whether caused by anxiety or depression, many of their problems are reflected in their work and environmental attitudes. The sensible patient, who wishes to be helped, visits his physician. Now, if the physician is less understanding than the patient and approaches the patient's problem improperly, is injudicious in his use of certain drugs, or selects a drug that is contraindicated for the patient he is treating, certain side reactions or complications may occur. One of these reactions is drug-induced depression, or the proliferation of a depressive state, which was overlooked in the hurry of taking the history and observing the patient. In practice, successful results with tranquilizers are dependent upon many factors. First is the wisdom of the prescriber, which is followed by a knowledge of certain basic facts and established therapeutic principles combined with an understanding of the indications, limitations, and contraindications of the various drugs the physician expects to prescribe.

The use of these drugs is not very complex. The physician should not expect all of the miracles with which these drugs were heralded, both by the manufacturer and in medical literature, nor must he impart his buoyant expectations to the patient. Both physician and patient might be greatly disappointed.

No single form of tranquilizer is universally applicable. Rational basis for drug therapy to accomplish the desired effect in individual patients depends upon proper selection of patients and the need for titrating gradually from smaller to larger doses of proper drugs. Inappropriate use of tranquilizing drugs may be potentially dangerous in certain unpredictable cases. Use of some of these agents in depressive states may

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cause serious consequences. Some ataraxics, particularly the phenothiazine derivatives and Rauwolfia alkaloids, may mobilize an incipient depression or exaggerate an existing one. A downhill course during treatment may be the first indication that the diagnosis was incorrect and that that which was thought to be an anxiety state was in reality an early, disguised depression.

Emotional or psychosomatic disturbances in many patients are due to reactions to acute, situational stress problems. These patients can be and should be effectively treated by the family doctor. Seldom is psychiatric care necessary. Another group of patients who suffer from highly distressing chronic tension states but who are able to carry on their daily tasks and do not wish the use of strong sedation, such as bromides or barbiturates, to interfere with their work, are excellent candidates for mild doses of the newer tranquilizing drugs.

Tranquilizing drugs have been prescribed with frequency and in varying dosage for persons in the so-called "normal" group, seen daily by the general physician and internist, to the wildest psychotic patients treated by the psychiatrist. Since my dealings have been with the so-called "normal" population, I must confine my statements to my observations of this group—admittedly the largest and most important segment of our patient population.

The normal population is subjected daily to intolerable stress. Newspapers, radio, television, and environment at home and on the job tend to create emotional states and situations producing reflections in the various organs of the body that require medical attention. These are psychosomatic states requiring the understanding and time of physicians from general practitioners to practicing professors. No longer are the states of anxiety expressed in bodily symptoms associated with particular organs, such as the heart, lungs, or stomach, found only in the housewife, the business executive, or the middle-aged salesman. Today, we are seeing a younger group of patients ranging from 15 to 25 years of age with anxiety states and neuroses that should not develop until the age of 35 to 50 years. The family physician is usually the first to see these patients. It is his job to treat them with able psychosomatic care and, if necessary, with properly selected and judicious dosage of present day drugs.

Prior to the advent of tranquilizer drugs, physicians had but a few drugs to help their patients. The old doses of bromides or barbiturates were usually the drugs of choice. These were

not the best. The depressant drugs, or barbiturates, in general act most strongly on the later-developed parts of the brain—the cortex of the cerebral hemispheres—and least so on the more primitive medulla oblongata, which contains vital centers for the control of heart rate, respiration, and blood pressure. Because of their pronounced effects on the cerebral cortex, barbiturates depress functions of the cortical regions concerned with the analyzing mechanisms of vision, audition, and other perceptive functions and the fine coordination of motor movements as well as thought and memory. Though the tranquilizers also affect functions ascribed chiefly to the cerebral cortex, their most potent actions are exerted on the subcortical structures regarded as parts of the anatomic substrate of emotions—the mid-brain reticular formation, the hypothalamus, and the components of the rhinencephalon.

The tranquilizers render the patient more receptive to understand his daily problems, allow him to continue to work or attend school or college, and do not produce lethargy. Mild anxiety or tension states can be pleasantly dissipated by small doses of the properly selected tranquilizing agent. Drug-induced depression will not be part of the picture.

Depression—a state of sadness with self-reproaches, psychomotor inhibition, sleeplessness or sleep disturbance, impaired appetite, and depressed moods—may run the gamut of all the possible symptoms of headache, dizziness, blurred vision, chest pain, constipation, urinary frequency, muscular aches and pains, and obsessive fears of physical impairment. A patient in a true depressive state must be carefully evaluated before prescribing drugs which might increase his state of depression and produce or accentuate suicidal tendencies. In the treatment of patients with hypertension, it is important to evaluate their psychic state, their outlook upon life, and their future. Most important, we must be certain that drugs prescribed for their hypertension do not produce a precipitous drop in their pressure and a simultaneous exacerbation of a hidden depressive state.

Since most hypertensive patients in the older age group have had their disease for some years, it is not, in most cases, a matter of life or death to achieve a rapid and sometimes disturbing drop in their pressure. Diminished blood pressure can be accomplished with gradually increasing doses of properly selected medication, a proper psychosomatic approach to the patient's problems, and a well-organized regimen of diet and mild exercise and the curtailment by degrees

of improper habits. The abrupt "dumping" effect of large doses of antihypertensive drugs may quite readily produce a full-blown depression, which might have been dormant and not troublesome to the patient.

It is important not to overlook depression or mildly depressed states when treating patients with tranquilizers. Depression may masquerade as an anxiety state or a simple psychosomatic condition. Ataraxics, like barbiturates, may enhance the depression and the risk of suicide or less drastic injuries. Patients who feel worse in the morning or blame the prescribed medication for their increased ill-being may very well be in true depression states.

Many of the drug-induced depressive states we read about were actually not induced by the drugs prescribed. These conditions were present in the patients when seen by the physicians, but inadequate histories and improper evaluations of their psychosomatic states failed to reveal the condition.

Clinical evaluation of drug-induced depressive states are difficult, since these evaluations must deal appropriately with a complex of forces which affect patient reaction and may leave erroneous impressions in the physician's mind of the causative forces producing depression states.

In the past few years, I have come to note that a number of patients, both young and old, have developed depressive attitudes merely by visiting physicians who were, perhaps, too busy at the moment to sit and talk about their problems. A few words, the written prescription, and the farewell "come back in a few weeks if you don't feel any better" may be just enough to produce depression in a youngster or older person who has been previously shunted by parents or, in the case of the older patient, by his children. In such patients, then, "iatrogenic depressive states" might occur.

Patients may find compensations in their supposed illnesses and may wish to preserve their complaints and, therefore, are adversely affected by even the proper drug in the correct dosage. The pharmacodynamic effects of the drug may be entirely different than expected. This could be the physician's fault rather than the drug's. In many instances, doctors prescribe new drugs

for patients who return apparently in a depressive state. The physician might more advisedly use his time taking repeated histories. In this manner, he may discover that certain extraneous forces during the time they were taking the previous medication may have created the depression or worsened the original mild depression. External influences which affect the state of the patient's physical, functional, and psychic state, such as a change in the course of his illness, a change in the weather, a frustrated love affair, change in world affairs with blatant headlines in the newspapers, a family quarrel, or even a mildly unhappy experience, may all be factors causing depression. Thus, the nonsearching physician, like the patient, will attribute this condition to the drug, and the "drug-switching procedure" will begin.

It is unfortunate that many of us in the practice of medicine who are unskilled in the pharmacology, toxicology, and therapeutics of most drugs allow ourselves to be swayed by the manufacturer of the drug or the author of a paper published in a journal concerning the dosage necessary to accomplish certain results. Usually, most physicians follow such instructions or even prescribe a little "extra." Dosage should be carefully chosen. I have found that with most drugs, a series of graded doses provides a much more substantial and gratifying result. Beginning with the minimum dose and gradually increasing it until the desired effect is achieved accomplishes a built-in degree of patient sensitivity and reaction. This eliminates the didactic approach to drug dosage and, in many instances, eliminates side reactions, states of excitation, or depression.

Judicious use and proper selection of drugs prescribed is most important in the care of the so-called "normal" patients. Psychosomatic care of approximately 25 to 30 per cent of our patients is part of the present day physicians' practice. I surmise that this percentage will increase in the future. Knowledge of the proper use of the newer drugs is important. Taking a proper history and observing the patient before and during drug therapy might well aid in preventing full-blown psychotic states. Nothing can take the place of listening sympathetically to the patient's story.



Notes from a Medical Journey

Naples, Italy
26 October, 1958

Dear Jay:

We are just back from a Sunday picnic on the Sorrento Peninsula; the moonlight sparkles on the Bay of Naples; lyophilizing of the food samples from Dalmatia is almost finished; notes from Henry Blackburn and Josef Brozek in Yugoslavia bring good news; a letter from Henry Taylor in Minnesota says all is well under the stadium; and we look forward to a good dinner at 9:00 p.m. In other words, our only care is the prospect of the confusion tomorrow when we load all our gear on the "Guilio Cesare" for the trip home. On the boat there will be work to do, including reviewing a stack of fellowship applications for the American Heart Association, but the pressure will be off.

For our last evening in Yugoslavia, the officials of Makarska and the local doctors gave us a nice dinner, with "Good Bye" worked in a design of flowers on the table, and presents, including a huge photograph of Makarska signed by all. The speeches were few and simple, but then someone started to sing and it all ended in a regular song fest, mostly Yugoslav folk songs but interspersed with New Orleans jazz rendered by Henry Blackburn on the clarinet and Eric Zetterquist on the piano.

After driving to Split, we took a local boat for the fifteen-hour trip to Rijecka ("Fiume") and loading the car was something to remember--driving up two long and wobbly planks at an angle of 30 degrees while a dozen men screamed instructions in Croatian and then caught the car at the top and proceeded to manhandle it aboard in a space with only inches to spare. Everyone, including myself, was dripping with sweat by the time the impossible had been accomplished, but the sailors were in high spirits, especially when I gave them the half bottle of slivovitz I had in the car--they promptly up-ended it, washed out the bottle, and returned it with thanks!

We were "de luxe" with a tiny cabin, but every inch of public space on the boat was jammed with people and their baggage -- trunks, suitcases, jugs of wine, sacks of potatoes, baskets of grapes, etc., so that getting from one end to the other of the narrow passageways was a gymnastic feat

involving ten minutes of saying "excuse me" in every language we know. But, even after all night in such quarters, everyone was in good humor and eventually they were all ashore on the dock at Rijecka, the gangway was removed and replaced by planks, the car was manually heaved around until it was poised at the top, and down I slid into the seething mob below.

Crossing the border took only five minutes (no questions even about currency) and then we were racing along a fine Italian highway, reading signs in a language we could understand, and feeling as though we were practically back in Minnesota. At Padova, we met the Klepetars exactly as scheduled and went on to Bologna for talks about heart research with our old friends, Drs. Arrigo Poppi and Teodore Posteli. They are keen to start a program near Bologna modeled after ours in Yugoslavia and elsewhere, and I want to help because the local situation is interesting in that part of the Po Valley. More animal fat is eaten there than anywhere else in Italy, and there is certainly much more coronary heart disease in the hospitals than in Naples, Sardinia, and Calabria where we have worked before. But the diet has not been studied accurately, and no proper survey of the frequency of heart disease has been made.

And so to Rome and many conferences, especially with Dr. Vittorio Puddu, the new general secretary of the International Society of Cardiology, and Dr. Wallace Aykroyd, director of the Nutrition Division of the Food and Agriculture Organization of the United Nations. The plan for a systematic program of international research on the epidemiology of heart disease, on which I have been working hard, is coming more and more into focus and we have strong backing in Italy. A team organized by Dr. Flaminio Fidanza has made a trial of our new scheme of trying to examine all men in a pre-selected area; they missed only 1 man out of 790 aged 45 to 65 in the chosen area in the Province of Marche!

In Rome, we agreed that Professor Gino Bergami of Naples, at one time or another minister of Food, of Education, and of Health for Italy, would be the ideal chairman for the Italian Committee, so I was delighted when, at Naples, he immediately assented. Accordingly, on the boat home, I shall ponder the details for a five-year plan for Italy to mesh with all the other plans, even though we still have no guarantees about the necessary funds. Among other things, we suggest that the Naples Institute could be the central reference laboratory for Europe, doing most of the cholesterol and food analyses from all over, because Fidanza can maintain meticulous precision and the going rate for a good technician is under \$100 a month. And, at only twice that salary, we can employ full-time, good, young internists with several years of special training in cardiology!

The salaries in Yugoslavia are even less, but there are too many other complications in that country -- money control, lack of all kinds of material supplies, red tape, and vast delays in sending anything in or out across the frontier. A first-class airmail packet (printer's proofs of our new book, "Eat Well and Stay Well") took three weeks from Makarska to New York, and a cablegram from Helsinki took a week to reach me! The note I just received from Henry Blackburn took less time, but you can never tell what to expect.

Henry's note, by the way, informs me that the record of 100 per cent response in the examinations has continued to almost 700 men, and, so far, not a single infarct has been found. In a couple of days, the team will have finished the Dalmatian area, being helped by Dr. P. From Hansen and his wife, a general practitioner, who arrived from Copenhagen for the last two weeks of the work. Then Henry will hurry to Rome to review the records from Marche as well as to go over the chest films of the men we studied in Calabria last fall. He and Puddu, who is also chairman of the Committee on Nomenclature for the International Society, will have a good opportunity to make a practical test of the ECG classification system we are tentatively proposing for population studies.

The second phase of the Jugoslavian research operation, identical to that in Dalmatia but situated in an area of Croatia where the diet is different, will start about November 10 with the same team plus Dr. Rautaharju of Helsinki who, in spite of his youth, is increasingly recognized as the coming man in electrocardiography in Finland. In January, he will come to Minnesota to stay the better part of a year with us at the lab. He may take part in studies on the hypoxia test with Ernst Simonson and on vectors with Otto Schmitt but will spend much of his time on the big job of analyzing the ECGs from Jugoslavia and the most recent series from Italy. We are anxious to compare these with the records on some 1,500 railroad employees obtained by Henry Taylor and the crew of our railroad laboratory during this past year.

We had hoped to see Arrigo Poppi again here in Naples on his way back from a trip to Sicily, but he 'phoned from Messina to say he is delayed. Poppi is in a predicament peculiar to academic life here in Italy. All heads of departments in the Italian universities are drawn from a pool of men who have been certified as eligible for such responsibility by committees of professors in the several fields who, moreover, place the candidates in a kind of rank order of choice. Poppi was so certified in the top bracket for internal medicine about three years ago but until now has not been called to a chair by one of the universities, and the rub is that this certification has a time limit of three years, after which one has to begin all over again. So, as the deadline draws near, poor Poppi has been frantically rushing all over Italy to find a medical school that will give him a chair. Generally, each school has 2 chairs in medicine, 1 for theory and 1 for practice, so there are some 40 chairs in all Italy. Since Poppi is certainly one of the best of the younger men in academic medicine here, a fine clinician and teacher and very active in research and writing textbooks and monographs, he ought to be a prime choice. But he is identified as espousing the specialty of cardiology, and this is viewed by men of the older school as being a threat to "compartmentalize" the all-embracing art of medicine. The same view is by no means unknown in the United States, but it does not have such serious consequences. We have far more good jobs, and the difference between a department head and everyone else in the school is not nearly as great as in Europe.

Flaminio Fidanza has just come in bringing a new Italian coffee machine as a present to Margaret and a batch of mail, including a long letter from Paul White full of talk about the new organization of the International

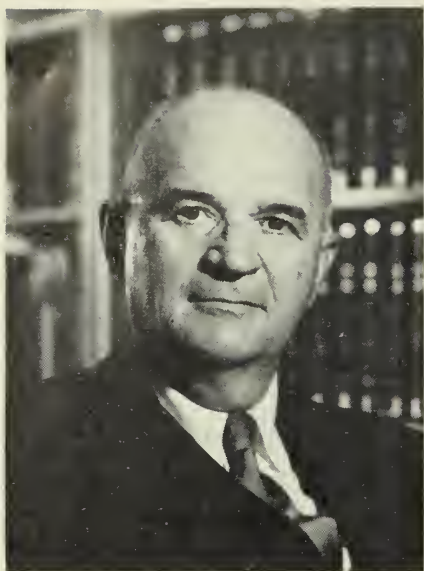
Society of Cardiology, my responsibility as co-chairman of the Research Committee, and his desire to get collaboration from the Russians and the Red Chinese. We thought for a moment that we might see Paul here in Italy because, when the Pope was stricken, the Italian newspapers said that Dr. White might be flying to Rome. But Dr. Galeazzi Lisi, the Pope's personal physician, did not summon him.

Incidentally, Galeazzi Lisi is in a real mess -- to the delight of many -- and has been kicked out of the Vatican and may well be publicly denounced by the Rome Medical Society. For years, he has offended by his blatant self-advertising, including his name in bronze letters 2 ft. high running all around the building where he has his offices in the Piazza Barberini, and he is reputed to have been connected with all sorts of dubious drugs and money-making treatments with outlandish claims. But the commercialization of his personal account of the last hours of the Pope, death-bed microphotos, etc., was just too much. When the storm broke, he returned uncashed a very large check for his exclusive story about the end of the Pope, but it was too late.

And now it will be too late for dinner if I do not sign off. I shall see you soon in Minnesota where, I fear, we may exchange freezing weather for the golden days and warm nights we have been enjoying in Italy.

As ever,

A handwritten signature in cursive script, reading "Ancel Keys". The signature is written in dark ink and is positioned in the lower right quadrant of the page.



Waltman Walters, M.D.

The Enemy of Time

IT IS SAID THAT Napoleon Bonaparte, vexed by the precious minutes that were slipping away from him during one of his notable exploits, turned to an aide and said: "Go, sir, gallop, and don't forget that the world was made in six days. You can ask me for anything you like, except time."

A constant skirmish with time and sufficient victories over that thief of man's enterprise presumably explain how Dr. Waltman Walters manages to accomplish the many tasks he has set for himself, for there is no other credible explanation. He is chief editor of the A.M.A. *Archives of Surgery*; he is editor in chief of the Dean Lewis *Practice of Surgery*; he is professor of surgery in the Graduate School of the University of Minnesota; he is a member of the Board of Governors of the Mayo Clinic and vice chairman of the Mayo Association; he has been a trustee of the Shattuck School in Faribault; and he has somehow managed to find time to consummate a keen interest in naval affairs with the two stars of a flag officer, attaining the grade of rear admiral in the United States Naval Reserve in 1956.

Dr. Walters is a product of the Midwest; specifically, he was born in Cedar Rapids, Iowa, and he grew up in Omaha and Sioux City. His father was a railroad man in the days when the locomotive was truly an iron horse, snorting great clouds of black smoke and emitting breaths of live steam. The young man was graduated from Shattuck School, Dartmouth College, and the Rush Medical College, and received the degree of doctor of medicine in 1920.

His original love was clinical medicine, and, as

soon as he had completed his internship at St. Luke's Hospital in Chicago, he applied for and was granted a fellowship in medicine in the Mayo Foundation at Rochester. But the appeal of surgery in an atmosphere dominated by two world-famous master surgeons proved too strong to resist, and, in 1922, Dr. Walters embraced the field to which he has been faithful ever since. He became head of a section of surgery in the Mayo Clinic in 1924, and, from that date onward, he has battled incessantly against time and other distractions to become an acknowledged authority on abdominal surgery in general and surgery of the biliary tract, stomach, and duodenum in particular. He has also trained a small regiment of graduate students of the Mayo Foundation in the technics for which he is now so well known, and he has opened the threshold of an eminently successful career to many a young man now prominent in surgery in the United States.

The manifold endeavors to which he has given undivided devotion have not gone unnoticed. Dartmouth College gave him the honorary degree of doctor of science in 1937, and the Hahnemann Medical College awarded him the honorary degree of doctor of laws in 1942. His colleagues in the Interstate Postgraduate Medical Association chose him as their president in 1950; his colleagues in Rochester elected him president of the Society of the Sigma Xi in the same year. In Minnesota, he has served as president of the Southern Minnesota Medical Association and the Minnesota Surgical Society. He was one of the founder members of the American Board of Surgery, Inc., the American Board of Urology, Inc., and the Central Surgical Association. Over the years, he has contributed some 650 papers, chapters, and other works to the surgical literature. In 1942, he was the author, with Dr. James T. Priestley and the late Dr. Howard K. Gray, of the volume *Cancer and Other Malignant Lesions of the Stomach* and, in 1940, with Dr. Albert M. Snell of *Diseases of the Gallbladder and Bile Ducts*.

Assigned to active duty as a rear admiral in 1957, Dr. Walters was one of the leaders of a flying expedition of medical specialists who lectured at Army and Navy medical institutions in the Orient, from Hawaii to Japan, at the solicitation of the Surgeon General of the United States Navy. In the same year, he was invited to give the tenth Julius Friedewald Memorial Lecture at the University of Maryland.

Dr. Walters was married in 1921 to Miss Phoebe Mayo, daughter of Dr. and Mrs. William J. Mayo. On summer week ends and holidays, Dr. and Mrs. Walters usually are exploring the reaches of the Father of Waters in their small cabin cruiser, *Star Dust*. On such forays, for all his two stars as a flag officer, Dr. Walters usually gives over the prerogatives of sea rank to Mrs. Walters, who carries on as an entirely competent skipper while he assumes the less arduous duties of first mate, always ready to pipe the landlubbers aboard.

Lancet Editorial

The Seventh International Cancer Congress

THE SEVENTH INTERNATIONAL CANCER CONGRESS was held in London, July 6 to 12, 1958, under the auspices of the International Union Against Cancer and attracted 2,500 professional and lay delegates from 63 countries. From the reception on Monday evening given by the president of the Congress, Sir Stanford Cade, to the drop of the gavel on Friday night, not a moment was left unplanned. The opening ceremonies by the Duke of Gloucester and Professor J. A. Maisson of Belgium, president of the International Union Against Cancer, were most impressive. Television cameras, radio microphones, and newspaper articles were conspicuous the first day—silent and absent the remainder of the week. The sudden rise in popularity of the Volunteer Health Insurance Plan, the Queen's illness, and a murderer remaining at large stole the headlines.

In addition to the scientific sessions, opportunities were offered for tours of London, to hear the London symphony's rendition of "Aïda," and to enjoy numerous friendly buffet suppers and entertainment.

A large American delegation was in attendance. Included among the American Cancer Society leaders were Dr. Lowell Cogashell, the American Cancer Society president; Dr. John Heller, head of the National Cancer Institute; and Dr. Harold S. Diehl, senior vice-president for research and medical affairs. Our northwest area was ably represented on the scientific side by papers presented by Dr. O. H. Wangenstein of the University of Minnesota on "The Experiences With Second Look Procedures in the Control of Gastrointestinal Malignancies" and Dr. W. E. Cornatzer of the University of North

Dakota Medical School on "P³² in Cooperation with Cellular Phosphorus Fraction of Ascites Tumor."

Most of the plenary sessions were held in the new festival auditorium—a spacious, four-story, modern building. The climb to the main auditorium on the fourth floor was worth the effort. The stage had a beautiful backdrop simulating pipes of an organ. Earphones and translators were available for foreign papers. Many smaller meetings were held in historic London County Hall, only a short five-minute walk. Some gatherings were scheduled in the actual chambers where so much English history has transpired.

Nothing new was presented in the numerous papers that would indicate that we are at the verge of a breakthrough in the cancer barrier. All of the investigators in cancer research simply appeared more advanced in their projects.

In addition to our scientific leadership, I learned that no other country has as many volunteers in the cancer control program as has the United States. Other countries are continuing to look to us for leadership, and it is our duty to maintain our position of spirited leadership in this field.

During this Congress, difficulties and differences among nations traditionally on different sides of the political barrier were entirely absent, as the fight against cancer is a nonpolitical as well as an international problem. Choosing Moscow as the meeting place for the 1962 Eighth Congress reflects the thought that medical science may develop a basis for mutual understanding of other world-wide problems.

C. M. LUND, M.D.
Williston, North Dakota

Principles of Internal Medicine, edited by T. H. HARRISON, M.D., ed. 3, 1958. New York: McGraw-Hill Book Co., Inc., 1,782 pages. \$18.50.

This third edition of Harrison's textbook of Internal Medicine hews to the line previously set and throughout attempts to emphasize physiologic and anatomic principles concerned in each disease. The concept of the physiologic basis of internal medicine is presented and clarified by the free use of tables, colored plates, and anatomic diagrams.

The discussion of electrophysiology, for instance, aids in the subsequent consideration of disturbances of circulation. Newer laboratory procedures rightly have been included. The emphasis upon physiology, as would be expected, probably does lessen the space devoted to therapeutic suggestions. However, and for instance, the discussion of the treatment of diabetes mellitus is not oversimplified, and clinical descriptions of disease and physical findings have a place in this text. The 98 contributors have well portrayed the newer aspects of medicine.

This is a good book for the physician to have in his own study.

C. A. MCKINLAY, M.D.

Handbook of Respiration, analysis and compilation by PHILIP L. ALTMAN, JOHN F. GIBSON, JR., M.D., and CHARLES C. WANG; edited by DOROTHY S. DITTMER and RUDOLPH M. GREBE. Prepared under direction of the Committee on the Handbook of Biological Data, Division of Biology and Agriculture, The National Academy of Sciences, The National Research Council, 1958. Philadelphia: W. B. Saunders Co., 403 pages. \$7.50.

This book is undoubtedly the most comprehensive compilation of facts and figures on respiration that has ever been assembled. The anatomy, physiology, chemistry, pathology, and pharmacology of the respiratory system in man and other animal organisms are extensively treated. The greatest emphasis is on man and other mammals. Physicians, especially clinical investigators, will find this volume invaluable as a first source of basic information and as a source of references to the literature on literally thousands of specific subjects. It should greatly simplify the problem of retrieval of in-



formation for every student of respiration in both basic and applied aspects.

This volume is the sixth in a series of Handbooks of Biological Data prepared and contributed to by leading authorities in their several fields. Their critical judgment is largely responsible for the reliability of the data.

MAURICE B. VISSCHER, M.D.

Diagnostic Bacteriology, by ISABELLE G. SCHIAUB, A.B., M. KATHLEEN FOLEY, M.A., ELVYN G. SCOTT, M.T., and W. ROBERT BAILEY, Ph.D., ed. 5, 1958. St. Louis: C. V. Mosby Co., 338 pages. \$4.75.

This useful textbook began as a laboratory manual in 1940. In each succeeding edition, the text has been increased until the present edition is a book of 338 pages.

The text is divided into main parts: namely, Bacteriologic Methods, Bacteriologic Diagnosis, Determination of the Susceptibility of Bacteria to Antibiotics, Serologic Diagnosis, Mycotic Infections and Media, and Stains and Staining Technique.

The chapters included under Bacteriologic Diagnosis comprise nearly one-half of the entire volume. These chapters yield a considerable amount of practical information, which is written in a pleasing style.

One is somewhat surprised and disappointed in the lack of illustrations. The only illustrative material in the book appears in the section on Mycotic Infections in which line drawings are used to help differentiate the various mycoses. It would seem that other portions of the text would be enhanced by drawings and photographs.

This is an excellent book and should be most useful in clinical laboratories, schools of medical technology, and in courses in medical bacteriology.

REUBEN F. ERICKSON, M.D.

Epilepsy Handbook, by FREDERIC A. GIBBS, M.D., and FREDERICK W. STAMPS, M.D., 1958. Springfield, Illinois: Charles C Thomas, 101 pages. \$4.75.

Professor Gibbs is one of the early pioneers in the electroencephalographic study of the epilepsies. In 1937, with Lennox and Erna Gibbs, he propounded one of the first classifications of these disorders based upon electrographic characteristics of the ictal discharge. This classification is still employed to some extent, although appropriate modifications have been introduced to include newer information on the focal epilepsies and especially the characteristics of the inter ictal electroencephalogram. For example, the psychomotor epilepsies are now classified as temporal lobe seizures to conform with the discovery that seizures of this type are most frequently associated with an inter ictal spike discharge in the anterior temporal region.

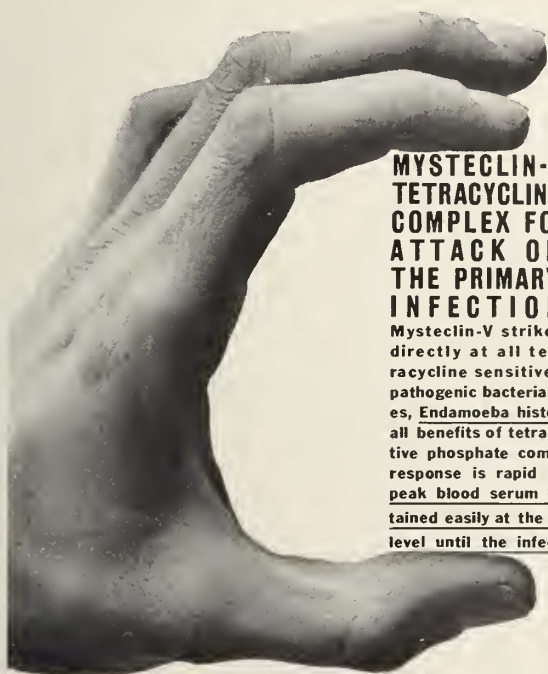
In collaboration with Dr. Frederick Stamps, Professor Gibbs has brought two decades of experience together to produce this little Handbook for the general physician. The book deals with the fundamental nature of epilepsy, and with its diagnosis and treatment. Included are such questions as the role of heredity, infection, and trauma as causative agents. The various types of epilepsy are described, and special attention is devoted to such forms as infantile spasms or hypsarrhythmia, which are not adequately covered in most standard textbooks. Throughout the text, the authors emphasize the fact that epilepsy is a medical disease—a metabolic disorder of cerebral neurons—often limited to a small portion of the total mass of central nervous tissue. Such metabolic dysfunction is expressed in the form of abnormal electrical potentials or cerebral dysrhythmia when recorded with the electroencephalograph.

Various forms of therapy, including an up-to-date review of drugs and surgical treatment, are outlined. The section on psychiatric treatment is so excellent as to bear quotation.

"Erroneous beliefs about the psychological causation of epilepsy and associated personality disorders are so widely held by parents, teachers, social workers, and physicians that many cases of epilepsy are inadequately treated by amateur and professional psychiatrists with major

(Continued on page 32A)

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References: 1. Cronk, G. A., Naumann, D. E., and Caston, K.: Antibiotics Annual 1957-1958, New York, Medical Encyclopedia Inc., 1958, p. 397.
2. Newcomer, V. D., Wright, E. T., and Sternberg, T. H.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia Inc., 1955, p. 686

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BOOK REVIEWS

(Continued from page 130)

emphasis on psychotherapy and little attention to medication.

"Basic misconceptions occasion much unnecessary suffering among parents for they often blame themselves for having said or done something that 'caused' their child's epilepsy. The tragedy is compounded when the patient is made to believe that he can stop his seizures, rage attacks, confusional spells, or personality disturbances if he changes his attitudes, rechannels his emotions, or improves his interpersonal relations.

"... epilepsy is a medical disorder like diabetes, and the informed physician can not subscribe to the prevalent delusion that it has a psychosomatic, psychological, or social basis. Of course, the patient should be dealt with kindly, reassured, and supported psychologically and accorded all the rights and privileges of a human being. The nature of his illness should be explained, and he should be helped to understand and accept that part of his trouble that can not be eliminated.

"The major personality disorders and the severe behavior disturbances that occur in some cases of

epilepsy are commonly assumed to be caused by feelings of insecurity, or by the overprotecting or rejecting attitudes of parents, or by interpersonal reactions of some type. This assumption may be correct in certain cases, but such an interpretation does not take into account the fact that serious personality disorders and severe behavior disturbances occur chiefly in those epileptics who have temporal lobe epilepsy or a type of seizure discharge that indicates thalamic or hypothalamic involvement. *The patient's emotional reactions to his seizures, to his family, and to his social situation are less important determinants of psychiatric disorder than the site and type of the epileptic discharge.*"

The authors also emphasize the fact that with present medical therapy, seizures can be controlled in 80 per cent of patients with epilepsy.

A very few minor objections can be made. The evidence that 14 and 6 per second positive spikes indicate "thalamic or hypothalamic epilepsy" is still not convincing. Our own studies suggest that such discharges may arise in the region of the posterior hippocampus, which would place this type of seizure within the general group of limbic

system seizures, of which temporal lobe epilepsy is also a part. Exception may also be taken to the concept of migration of epileptic foci in children if this is taken to mean that a localized metabolic abnormality in one part of the brain actually moves to another region. It seems more probable that the occipital focus of infants is rather a projected disturbance from deeper-lying ganglia. The surface projection of such ganglia may alter in the course of ontogenesis with the development of functional pathways having a different surface distribution and perhaps also depending on differences in the rate of maturation of the various cortical areas able to respond to such projected discharges.

These, however, are minor objections and are more important to the epileptologist than to the general physician. The presentation is clear and as concise as is consistent in affording some understanding of the basic pathophysiology of the epilepsies. The book is highly recommended for the general physician, pediatrician, or other nonneurologic specialists. It will also be useful to residents in training and to well-informed social workers or teachers.

FRANK MORRELL, M.D.

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News Briefs . . .

North Dakota

CELEBRATING its seventy-fifth anniversary this year, the University of North Dakota recently awarded 14 honorary doctor's degrees at a special convocation. Thirteen of the degrees were presented to alumni of the University who have achieved distinction for outstanding accomplishments in their specific academic fields.

* * * *

DR. NORMAN B. ORDAHL, a surgeon with the Rodgers and Gumper Clinic in Dickinson, was recently appointed diplomate of the American Board of Surgery. He is the first surgeon in the Dickinson area to receive the honor and is one of the few diplomates of the American Board of Surgery in North Dakota.

* * * *

THE FOLLOWING PHYSICIANS were licensed January 10 to practice in North Dakota: Jose R. Alfonso, State Sanatorium, San Haven; Paul L. Ahlness, Bowman; R. Douglas Doss, Grand Forks; Herman H. Eelkema, Fargo; Charles A. Hamilton, Bismarck; Guenther H. Heidorn, Minot; Leonids A. Rudis, Rosemount, Montreal, Canada; Otho M. Simms, Northwest Clinic, Minot; Konstantin Sparkuhl, San Marino, California, to locate in Harvey; and Sushenkumar J. Thakor, State Hospital, Jamestown. Drs. Alfonso, Rudis, and Thakor are graduates of foreign medical schools and are not United States citizens. They were granted temporary licenses, which are valid until January 10, 1965.

* * * *

DR. WILLIAM F. McCULLOUGH recently opened new offices in Bottineau and is no longer associated with the Malvey Clinic.

* * * *

DR. DAVID J. HALLIDAY, of Kenmare, is now practicing Tuesday and Thursday mornings in Bowbells. His office is in the Bowbells Hotel.

* * * *

DR. RUSSELL O. SAXVIK resigned March 1 as superintendent of the Jamestown State Hospital. He has accepted a residency in psychiatry at the Nebraska Psychiatric Institute in Omaha. Dr. Saxvik became superintendent of the hospital in 1953. At that time, he was also state health officer, an appointment he received in 1947. He was instrumental in establishing the North Dakota Mental Health Association and the Mental Health Volunteers, a local group. Upon completion of his three-year residency, Dr. Saxvik plans to return to North Dakota.

Minnesota

DR. HAROLD S. DIEHL, dean emeritus of the University of Minnesota College of Medical Sciences, was honored recently at a medical symposium and dedication of a new medical school building named Diehl Hall. The \$2,750,000 building will be completed next fall and will house the university's medical-biological library and medical research facilities. Dr. Diehl is now residing in New York City where he is senior vice president for research and medical affairs and deputy executive vice president of the American Cancer Society.

(Continued on page 36A)

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NEWS BRIEFS

(Continued from page 35A)

DR. DONALD C. BALFOUR was awarded an honorary fellowship in the Royal College of Physicians and Surgeons of Canada in absentia at the convocation of the college in Vancouver in January. Dr. Balfour became assistant in pathology at the Mayo Clinic in 1907. He is now an emeritus member of the Mayo Clinic staff, director emeritus of the Mayo Foundation, and emeritus professor of surgery in the graduate school of the University of Minnesota.

• • • •

DR. C. WALTON LILLEHEI, professor of surgery at the University of Minnesota Medical School, has been named an honorary member of the International Medical Club. Dr. Lillehei accepted the honor, with an honorarium of \$100, for his accomplishments in cardiovascular surgery at the annual meeting of the American Association for the Advancement of Science in Washington, D. C.

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DR. JAMES W. KERNOHAN, senior consultant at the Mayo Clinic, has been re-elected president of the American Board of Pathology. He is former chairman of the Sections of Pathology at the Mayo Clinic and became consultant last April. Dr. Kernohan is a past president of the American Association of Neuropathologists and the Minnesota Society of Neurology and Psychiatry and has served as vice president of the American Neurological Association. He was president of the Mayo Clinic staff in 1952.

• • • •

DR. LANE AREY has been elected president of Abbott Hospital's medical staff, succeeding Dr. John T. Pewters. Dr. N. C. Plimpton is vice president, and Dr. A. Boyd Thomes is secretary-treasurer. Drs. M. C. McCannel, W. W. Rieke, Elizabeth Lowry, and F. J. McCaffrey were elected to the executive committee.

• • • •

DR. R. G. PINKHAM has been elected chief of staff of St. Barnabas Hospital, Minneapolis. Outgoing chief, Dr. Edgar A. Webb, automatically became counsellor to the staff. Other officers include Dr. M. T. Michell, vice chief of staff; and Dr. D. G. Bohn, re-elected secretary-treasurer. Chiefs of sections are: Dr. Paul Bilka, medicine; Dr. U. S. Anderson, general surgery; Dr. John T. Moen, obstetrics and gynecology; Dr. A. V. Stoesser, pediatrics; and Dr. Archie Smith, general practice.

• • • •

DR. GEORGE D. EITEL has been elected chief of the medical staff of Doctors Memorial Hospital; Minneapolis. Other officers include Dr. Arthur Ide, Jr., vice chief of staff; and Dr. Richard Anonsen, secretary-treasurer.

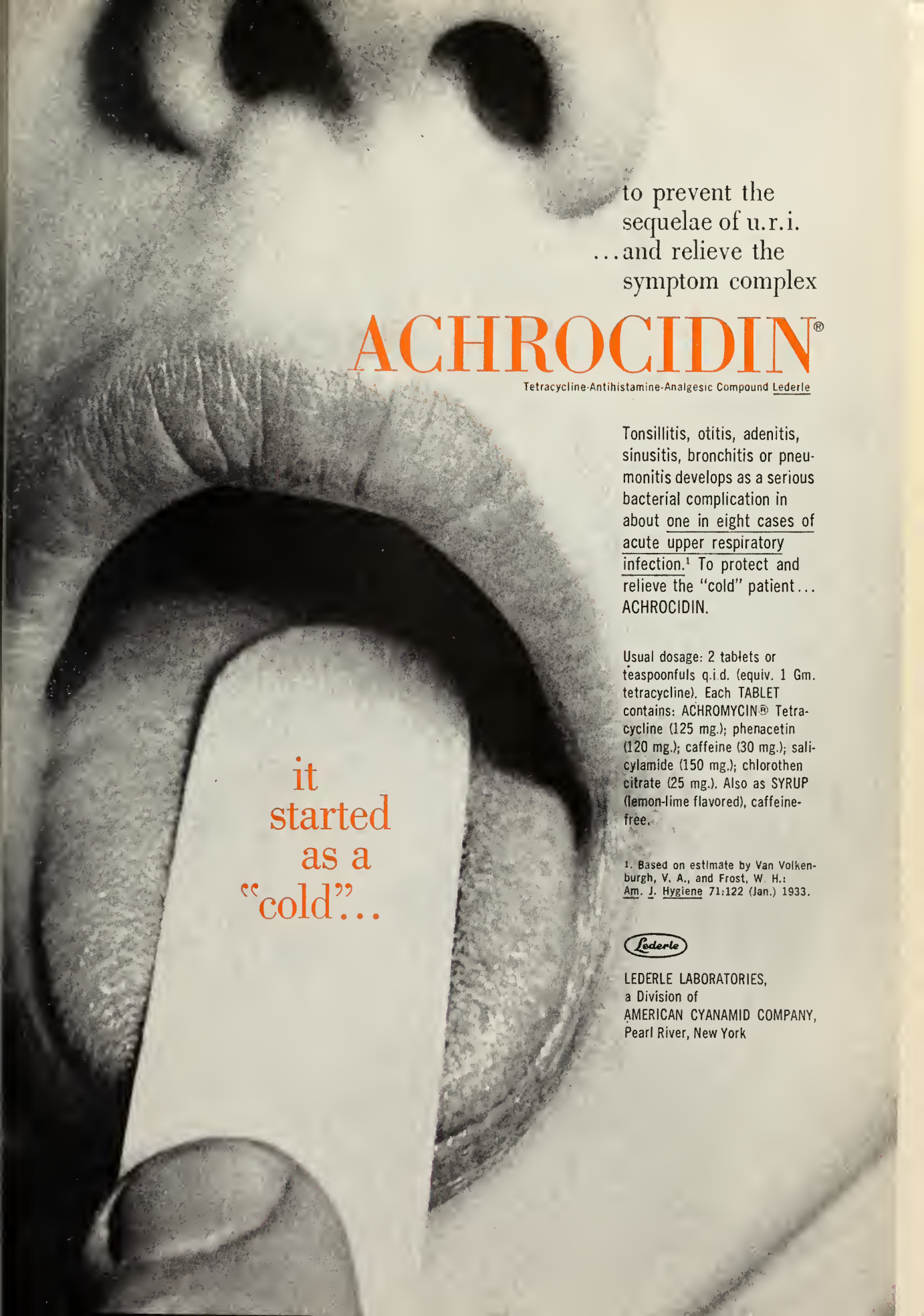
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DR. THOMAS J. GEREND has joined the East Range Clinic in Virginia and is specializing in pediatrics. He will be associated with Dr. Richard E. Payne. A graduate of Marquette University School of Medicine, Dr. Gerend interned at St. Mary's Hospital, Duluth, and specialized in Pediatrics at Children's Mercy Hospital, Kansas City.

• • • •

DR. WILLIAM H. THOMAS has become affiliated with the Chisago Lakes Clinic in Lindstrom. He is a graduate of St. Louis University of Medicine and interned at St. Mary's Hospital, Minneapolis. For the past nine years, Dr. Thomas has practiced in Howard Lake, Minnesota.

(Continued on page 38A)



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1. Based on estimate by Van Volkenburgh, V. A., and Frost, W. H.: Am. J. Hygiene 71:122 (Jan.) 1933.



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NEWS BRIEFS

(Continued from page 36A)

South Dakota

OPEN HOUSE was held recently at the new clinic in Bridgewater. The \$25,000, strictly modern building is of concrete block construction and houses up-to-date laboratories and consultation rooms. The clinic is staffed by Drs. Irwin Kaufman, Jose Villa, and Dennis Epp.

• • • •

DR. ROBERT E. BORMES, formerly of Milwaukee, has joined the staff of the Aberdeen Medical Center. A graduate of Stritch School of Medicine of Loyola University, Dr. Bormes interned in Evanston and took four years of special training in surgery at Veterans Administration Hospital, Milwaukee. Since completion of his training in July 1958, he has been assistant chief of surgery at the hospital.

Deaths . . .

DR. HAL DOWNEY, 81, hematologist and professor emeritus of anatomy at the University of Minnesota, died January 9. Retiring from the university in 1946, after more than forty years of service, Dr. Downey continued to lecture and work in his laboratory. His work on blood diseases included study of mononucleosis, leukemia, and bone marrow. For his lifetime research, Dr. Downey received the university's outstanding achievement award in 1951.

DR. ADOLPH M. HANSON, 70, of Faribault, Minnesota, died January 15 after an extended illness. He was renowned for his work in medical research. Dr. Hanson was a neurosurgeon in both world wars.

• • • •

DR. E. A. MEYERDING, 78, who retired last April as executive secretary of the Minnesota Tuberculosis and Health Association, died January 23 of complications following a fractured hip. St. Paul's first "school physician," he served as director of hygiene for St. Paul public schools from 1909 to 1924 when he assumed his post with the state Christmas Seal organization. In 1956, Dr. Meyerding received the William G. Anderson service award of the American Association for Health, Physical Education and Recreation.

• • • •

DR. FRANCIS J. SAVAGE, 83, who practiced in St. Paul until his retirement last May, died of a heart attack January 16. He was a surgeon for the Great Northern Railway for many years. A past president of the Minnesota State Medical Association, Dr. Savage received the association's distinguished service award in 1954.

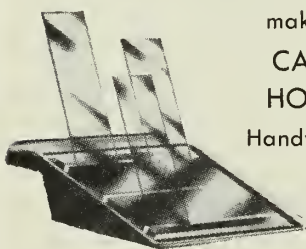
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DR. EDWARD B. TUOHY, 50, a member of the staff of the Mayo Clinic from 1935 to 1947, died January 12 in Los Angeles. He left Rochester in 1947 to enter the private practice of anesthesiology in Washington, D.C., where he became professor of anesthesiology in the Georgetown University School of Medicine. In 1951, Dr. Tuohy established practice in Los Angeles and, in 1953, he was appointed professor of surgery at the University of Southern California School of Medicine. He was also a consultant in anesthesiology for the U.S. Naval Medical Center and senior consultant for the U.S. Air Force.

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*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- "The Crush Syndrome," consisting of acute renal failure secondary to extensive crushing injuries, is the subject discussed by Donald Bravick, M.D., of Minneapolis, in the series on fractures. Conservative therapy often suffices in cases of anuria or oliguria secondary to crushing injuries. However, the high percentage of deaths occurring during the period of diuresis emphasizes the importance of continued care during this phase. In patients with massive injuries with rapid tissue breakdown and in those with prolonged anuria, some type of dialysis is necessary. Currently, the artificial kidney serves as the most effective type of dialysis for these patients.

- In the article "Rubella," which will appear in the series on communicable diseases, M. H. Poindexter, M.D., of Fargo, North Dakota, stresses the catastrophic effects on the fetus that may occur when the disease is contracted during the first trimester of pregnancy. Until an effective vaccine is developed that can be given to women who have not had rubella before they become pregnant, the best prophylactic measure is deliberate exposure to the disease before the childbearing age.

- The benefits to be derived from cutaneous biopsy are described by Hamilton Montgomery, M.D., of the Mayo Clinic, in his article "Value of Cutaneous Biopsy in Internal Medicine." Metastatic malignant tumors of the skin are among the examples given in which this procedure can be used to pinpoint the origin of the metastasis and spare the patient unnecessary exploratory operations. In other instances, cutaneous biopsy may lead to further laboratory studies in search of an underlying systemic disease, symptoms of which may not have as yet become clearly manifest.

- If untreated, endometriosis may result in ovarian destruction, deformity of the oviduct, bowel obstruction, or ureteral fibrosis. Since this disease seems to be increasing in incidence, the article "Conservative Management of Endometriosis" by Robert W. Kistner, M.D., of Brookline, Massachusetts, is particularly timely. Treatment is discussed under 4 headings: (1) observation and analgesia, (2) suppression of ovulation, (3) conservative surgery, and (4) extirpative surgery and radiation. Therapeutic measures designed to preserve and possibly increase the childbearing potential are suggested.

Meetings and Announcements

UNIVERSITY OF MINNESOTA MEDICAL CONTINUATION COURSES

April 16-18—Allergy for General Physicians and Specialists

May 11-15—Introduction to Electrocardiography for General Physicians

May 27-29—Otolaryngology for Specialists

June 15-17—Gynecology for General Physicians

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

MEETING OF THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

The seventy-second annual meeting of the North Dakota State Medical Association will be held in Bismarck May 2 through 5. All meetings, including those of the Council and the House of Delegates, will take place at the Prince Hotel.

COURSE IN THYROID DISEASE

On May 8 and 9, the University of Oklahoma will hold its annual Surgery, Radiology, Pathology Symposium entitled "Diagnosis and Treatment of Thyroid Diseases." The program will include lectures, round table discussions, and case presentations as well as meetings of the sponsoring groups, which include the Oklahoma Association of Pathologists, Oklahoma State Radiological Society, and Oklahoma Chapter of American College of Surgeons. Mail \$20 registration check to Office of Postgraduate Education, University of Oklahoma Medical Center, Oklahoma City 4.

CONGRESS OF PHYSICAL MEDICINE

The Third International Congress of Physical Medicine will be held in Washington, D.C., August 21 through August 26. Papers will be presented by experts in the field, and scientific and technical exhibits are planned. For further information, write Walter J. Zeiter, M.D., Secretary-General, or Dorothea C. Augustin, Executive Secretary, International Congress of Physical Medicine, 30 N. Michigan Ave., Chicago 2.

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The Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA,
NORTH DAKOTA, SOUTH DAKOTA AND MONTANA

FOREWORD

THE PILLARS of the foundation of tuberculosis control are case finding, case supervision, and treatment, including all aspects of rehabilitation. This issue of THE JOURNAL-LANCET contains a series of papers by outstanding authorities presenting timely reports on current thinking concerning these facets of tuberculosis control as well as venturing some prophecies as to its future control. They should be of interest to all practicing physicians, public health workers, and tuberculosis association workers.

The dilemma of the professional and nonprofessional individual who is devoting all or part of his time to the cause of tuberculosis control continues to be that of giving adequate publicity to the truly thrilling and remarkable progress that has been made thus far in the control of this disease and yet, in so doing, not to belittle the tremendous job still ahead and not to contribute further to the apathy of both the general public and professional public health worker with regard to finishing the job of eradicating tuberculosis.

The fact that over 40 million people in the United States are already infected with living, virulent tubercle bacilli, as estimated through tuberculin test surveys, should be enough to forestall any undue complacency, as these individuals will give rise to millions of new cases of active tuberculosis if the rate of breakdown of reactors into active disease continues at its present level. However, as continued progress is made, it does seem inevitable that a point will be reached in each community when it will be increasingly difficult to maintain adequate concern in regard to tuberculosis alone to permit achieving the ultimate objective of complete eradication of tuberculosis throughout the country. It is chiefly for this reason that almost three years ago the Board of Directors of the National Tuberculosis Association quietly took action and directed the national office to expand its interests into the entire problem of respiratory diseases, of which tuberculosis is a part.

Respiratory diseases as a group rank fourth or fifth among the causes of death, depending upon whether neoplasms of the respiratory system are included or excluded. Impressive though this is, it

is according to the criterion of morbidity rather than mortality that reveals the tremendous importance of this group of diseases. Completion of the first year of the National Health Survey of the United States Public Health Service from July 1, 1957, through June 30, 1958, revealed that among "acute condition," that is, illnesses which either resulted in consultation of a physician, caused a restriction of activity, or both, respiratory conditions accounted for two-thirds of the total, with over a billion "restricted activity" days, over 200 million days' loss of work, and 196 million days of missed school. To be sure, this period covered that of the epidemic of Asian influenza, but, even during periods when influenza was not epidemic, respiratory illnesses topped the list by a large majority.

Physicians and others concerned with tuberculosis control have necessarily always been involved to a certain extent with these other diseases from the standpoints of differential diagnosis and the adverse effect of these diseases on tuberculosis rates and because many of the control procedures which have been established or are being developed apply as well to other respiratory diseases.

The control of tuberculosis will continue to take priority over other activities of the national office of the National Tuberculosis Association, but, as further success meets our efforts, we intend to take an increasing interest in and try to do something about the larger problem of respiratory illnesses as a whole. In this endeavor, we plan progressively to enlist the assistance of our affiliated associations if and when progress in tuberculosis control in their respective areas merits devoting time, money, and energy to this expanded field. In the meantime, even in a vanguard state like Minnesota and its surrounding states, which are leaders in this country in the control of tuberculosis, these pillars of the foundation of tuberculosis control consisting of tuberculin testing and other case-finding procedures, adequate case supervision, adequate treatment, and rehabilitation will continue to receive major emphasis.

JAMES E. PERKINS, M.D., *Managing Director,*
National Tuberculosis Association

The Future of Tuberculosis Control and Treatment

KARL H. PFUETZE, M.D.

Chicago, Illinois

IT IS INDEED A PLEASURE to discuss the future of tuberculosis control and treatment and how the Minnesota Tuberculosis and Health Association may adapt its program to that end. To address this particular group on this subject may seem like "carrying coals to Newcastle," for Minnesota with its splendid leadership has long been in the vanguard in tuberculosis work.

But, since "there is always room for improvement" even though there is much reason for pride and satisfaction in the great progress made thus far, I'm sure all agree that there is no room for complacency. If we are to continue in our goal to eliminate tuberculosis from our midst, a tremendous amount of work remains to be done.

Let us examine some of the problems which face the tuberculosis association in Minnesota—and similar groups in all the other states too—in the task ahead.

1. We must bend our efforts to fight the increasing public apathy and complacency toward the problem of tuberculosis. We have emphasized the decline in the tuberculosis death rate so much that the average citizen is beginning to feel that tuberculosis is just about conquered. If the public is to continue its generous support of our work by its purchases of Christmas Seals, it must be convinced that the fight against tuberculosis is far from finished. Let's emphasize instead the all too slow decrease in the number of new cases discovered each year. Indeed, in several states, the number of new active cases has actually increased in the past year.

Let's point out that one-third of the population in the United States is *still* infected with the tubercle bacillus as evidenced by tuberculin testing surveys. The tuberculin test is by far the best

means to determine the index of infection in a community. It is axiomatic that every person with a positive tuberculin test has been exposed directly or indirectly at some time in the past to an active open case of tuberculosis. If we are to eliminate tuberculosis, this chain of infection must be broken. By tuberculin testing, we can not only determine who has been infected but, by careful follow-up, can frequently find the person who is spreading the disease. The splendid program of tuberculin testing in the schools and colleges in Minnesota should by all means be continued.

2. Good case finding is, of course, the key to good tuberculosis control. Each facet of your case-finding program should be carefully evaluated to make certain that the results justify the money and effort expended. Different methods and procedures may be required in different communities and areas, and the program should be tailored to fit the needs.

One of the most effective methods of case finding is to have a routine chest film taken of all patients admitted to hospitals. This includes private hospitals, state mental hospitals, city and county general hospitals, and nursing homes. By this means, the patient with an active case is discovered immediately and isolated before he exposes other patients and hospital personnel. Minnesota's record in this regard is good, but it can be better.

3. Every effort should be made to "sell" tuberculosis case finding to the private physician in his office practice. He has always been in the "front line" in tuberculosis case finding. Those communities are indeed fortunate in which the physicians are tuberculosis conscious and on the alert to detect it among their patients. The tuberculin test is easily done, and chest films for the reactors are readily available. The private physician can best be reached through his county and state medical society. Hence, a close co-operation between the association and the medical societies is essential.

I believe the tuberculosis association in Minnesota should have closer relationship and better

KARL H. PFUETZE is medical director and superintendent of the Chicago State Tuberculosis Sanitarium and clinical professor of medicine at the University of Illinois.

Paper presented at the annual meeting of the Minnesota Tuberculosis and Health Association in Minneapolis, October 27, 1958.

cooperation with the Minnesota Trudeau Society. In the past, these two splendid groups, which have the same common goal, have too often taken separate paths to reach that goal. In Illinois, where we have such a close and cordial relationship, it amounts to an interlocking directorate of the leadership of the tuberculosis association and the Illinois Trudeau Society. It was not always thus, but it was well worth the effort to achieve it.

4. X-ray film surveys have an important place in case finding, but they should be pinpointed toward those areas and groups which experience has shown to be most rewarding for the money and effort expended. In Chicago, such surveys have been most productive of new cases among food handlers, jail and prison inmates, and workers in industry. Careful long-term follow-up of all suspected cases is, of course, essential. An inactive tuberculous lesion discovered in a survey today may become active a year or two hence.

5. Compulsory isolation of recalcitrant infectious persons is essential if spread of the disease is to be prevented. Adequate hospital security facilities must be provided to forcibly isolate the patient who has no regard for his own health or that of others. The need for such security facilities is becoming increasingly important, especially in large cities where 20 per cent or more of the patients admitted to sanatoriums are chronic alcoholics or are uncooperative for other reasons. Close cooperation between public health officials, police, judges, and the sanatoriums is imperative if these recalcitrant patients are to be kept under proper control.

6. Research in tuberculosis, both basic and applied, must be continued and expanded. Research is the sine qua non of advancement. The tremendous progress achieved in the last decade in the treatment of tuberculosis didn't "just happen." It is the direct result of research which has improved chemotherapy, surgery, and our knowledge of pulmonary function. Research costs money—lots of it! It seems to me that our tuberculosis associations have a moral obligation to the public which supports them to increase the amount of money now earmarked for research. Look what happened in the case of poliomyelitis! The money spent for research to develop an effective vaccine paid off much sooner and more dramatically than anyone had dared hope for. The American Cancer Society and the American Heart Association are spending many times more for research percentage-wise than is the National Tuberculosis Association, which earmarks only 1 per cent of the proceeds from

seal sales to research. To improve this situation, the county tuberculosis associations in Illinois began several years ago to contribute additional amounts to finance tuberculosis research projects carried on in the medical schools in the state. From a small beginning, the amount has grown steadily. This year, nearly \$45,000 will be raised for this purpose!

RESEARCH PROJECTS

The following are some of the research projects now in progress in the United States.

Evaluation of new antituberculous drugs and different regimens and combinations of old drugs.

Studies to determine the optimum duration of drug treatment in the different types and classifications of the disease. We need to know "how long is long enough?" to treat a disease as chronic and unpredictable as tuberculosis.

Studies to discover a simple test to determine the activity of tuberculosis in the body. If successful, this would be a great advance.

Studies to further improve the tuberculin test as a tool in both epidemiology and diagnosis.

Studies to improve methods and procedures used in determining which patients should undergo surgery.

Studies to determine the effectiveness of drug treatment of persons whose tuberculin test became positive within a few months, indicating a recent infection. This is a long-term study and, if results are proved definitely favorable in preventing active, progressive disease, it would mean a great step forward in tuberculosis control of such cases.

Basic research on the tubercle bacillus to advance our knowledge of its components, various properties, and behavior under different conditions and the behavior and disease-producing properties of "atypical" tubercle bacilli as well as studies to learn which drug regimens are most effective in such cases.

Studies to improve our management of the cases requiring retreatment. Such patients are a major problem in our sanatoriums.

Research on the problem of alcoholism and tuberculosis. In large city sanatoriums the number of alcoholics admitted for treatment of tuberculosis is a problem which cries aloud for a solution.

Research on the relationship of tuberculosis and body hormones. What role should hormones play in the treatment of certain forms of the disease?

Research on the basic immunologic factors in the development of tuberculosis. Why do some

persons succumb more readily to tuberculous infection than others?

Research in pulmonary physiology, which will yield the answers to many problems now facing us in tuberculosis and other chronic pulmonary diseases.

Surely the foregoing research problems point out the need for financing those projects now under way and others which require investigation if progress is to continue.

THE CHICAGO STORY

As part of my assignment for this address, I was asked to tell something of the problems and progress of tuberculosis control and treatment in the Chicago area. To do so is a real pleasure, for the progress made there in the past decade has been tremendous. Chicago is a city of nearly 4,000,000 people, with another million living in the suburbs of Cook County.

During the late 1940's, Chicago was one of the black spots in the country as far as tuberculosis was concerned. The number of beds available for tuberculous patients was woefully inadequate, and all too often a patient's politics determined whether he was admitted for treatment. Morale and salaries of the medical staff and employees of the Municipal Sanitarium were both at low ebb. About that time, Mayor Kenney took tuberculosis out of politics and appointed Dr. Ernest Irons, a past president of the American Medical Association, as president of the Municipal Sanitarium Board. The state legislature appropriated funds to build a new 400-bed state tuberculosis sanitarium to be operated by the Department of Public Health. A Suburban Cook County Tuberculosis Sanitarium District was formed, and plans were made for a new 200-bed sanitarium. Oak Forest Sanitarium, a branch of Cook County Hospital, with 600 beds was modernized and refurbished. A

large case-finding program was started and vigorously pursued. The Chicago State Tuberculosis Sanitarium opened in 1953 and opening of the Suburban Cook County Sanitarium followed in 1954.

A few statistics tell the dramatic story of the remarkable progress which has since taken place. The death rate from tuberculosis in Chicago dropped from 64 per 100,000 in 1940 to 40 in 1950 and to 13 in 1957. In suburban Cook County, the death rate fell from 10 per 100,000 in 1950 to 2 per 100,000 in 1957. In 1947, Chicago had 1,500 persons with known active disease who were not hospitalized. As late as 1953, over 600 patients were still on the waiting list of the Municipal Sanitarium. Scores of patients died at home each year while awaiting admission. However, during 1953 and 1954, the waiting list decreased rapidly, and, for the past three years, there has been no waiting list! At the present time, we even have empty beds!

This truly remarkable achievement was the result of concerted action by an aroused citizenry, sparked largely by a splendid and relentless publicity campaign carried on by the tuberculosis association of Chicago and Cook County. It is an outstanding tribute to the fine cooperative effort of many groups working together toward a common goal. These groups include all of the official governmental health and welfare agencies—federal, state, city, and county—as well as unofficial and voluntary organizations, such as the Chicago Medical Society, the labor unions, the Chamber of Commerce and Industry, Parent Teachers Associations, and many others. Some wise person once said “when a good job is done, there is plenty of credit to go around,” to which I heartily agree. If tuberculosis is to be eradicated, it will be due in large part to the unselfish efforts and devotion of people who continue to work toward that goal.

Thirty-Five Years of Experience with the Tuberculin Test

S. A. SLATER, M.D.

Worthington, Minnesota

HISTORY REPEATS ITSELF even in the field of tuberculosis control. New and steadily increasing interest is being shown today in the tuberculin test, a simple skin test to detect tuberculous infection. Studies are being made, and much is being written and discussed regarding tuberculin solution, such as its method of administration and how to interpret the reactions it produces.

All this is reminiscent of the pro and con arguments of a third of a century ago. Many of us have used the tuberculin test consistently for a generation or more as our leading tuberculosis case-finding weapon. We find ourselves think a little sadly: "This is where we came in."

It was almost exactly forty years ago when I walked into the Southwestern Minnesota Sanatorium at Worthington, Minnesota, to become its superintendent and medical director. The sanatorium doors had opened in 1917 but were closed again from February 1918 to April 1919 because of a failure in the water supply. Therefore, I began work in what was actually a new institution.

Coming to Minnesota as a Virginian after six years as medical director in a Pennsylvania sanatorium, I had little knowledge of the Midwest and its people. Like most easterners of nearly a half century ago, I thought Minnesota would have little to offer but wilderness, uncivilized Indians, and scattered settlements of lonely pioneers. I found a prosperous farm country with an unusually intelligent populace. The 8 counties which made up that original sanatorium district covered an area of 4,915 square miles. Total population at that time was about 127,000.

Outstanding men made up the original sanatorium board—doctors and lay people who had a real interest in controlling their area's tuberculosis problem.

S. A. SLATER has been a member of the Board of Directors of the National Tuberculosis Association since 1930 and was medical director of the Southwestern Minnesota Sanatorium in Worthington from 1919 to 1957.

In 1919, the year the sanatorium actually began to function, there were 69 deaths from tuberculosis in the 8 counties. Contrast this with 1956—the last full year the sanatorium was in operation—when not 1 tuberculosis death was reported from these same counties.

In 1919, a sanatorium was considered by most persons to be little more than a halfway place on the way to the graveyard. Patients were admitted less in the hope of helping them than as a way of isolating them so they would not endanger others.

We had apathy bred of fear and superstition to combat. A great many people still did not believe that tuberculosis was an infectious disease. To them, it was a family illness passed down from generation to generation through heredity instead of through direct contacts with the members of the family. For these persons, it was difficult and often impossible to understand why they should send loved ones to a sanatorium to die away from home.

On the other hand, many persons were convinced that going to another climate offered the only possibility of a "cure." As one of the physicians in the district has stated, it was customary for friends to collect funds to send a tuberculous man or woman to Arizona. A few months later, they took up another collection to bring the body back for burial.

In spite of a belief on the part of many that the sanatorium was a place of last resort, it was not many months before the 54 beds were filled and we soon had a long waiting list. In the early years, many patients died. But, others recovered and returned to their homes, despite the fact that strict bed rest and good food were almost the only forms of treatment we could offer.

We were soon convinced that the tuberculous individual had a reasonably good chance of recovery—if his disease was discovered early. In almost every instance, the patient entered the sanatorium only after his disease was far advanced. Far too frequently, he arrived just in time to die. During the months or years before his disease was discovered or until he was will-

TABLE 1
TYPICAL SCHOOL FINDINGS, 1955

Grade	No. pupils	No. tested	Per cent tested	Positive	Per cent positive
Kgn.	184	177	96.16	0	0.0
6	117	116	99.15	1	.86
9	216	216	100.00	7	3.24
12	157	157	100.00	4	2.54

ing to accept treatment, he had been spreading tubercle bacilli to his whole family and, sometimes, to a whole community. In every community, seeds of new disease were being sown, and we were on our way toward a steadily increasing tuberculosis burden.

It became our first responsibility to find the causes early. We were, of course, aware of the tuberculin test and were using it in diagnosis. Would it also be valuable as a screening device to find infected individuals in an apparently healthy segment of the population?

Most of the authorities said "No." They quoted a long-held theory that all persons were infected with tubercle bacilli by the time they finished high school. These conclusions were based on previous testing results, but the fact was overlooked that those tested came from families in which there had been tuberculosis or from districts in which the death rate was particularly high.

A true picture could be obtained only by administering tuberculin to a cross section of the school population rather than to a small area. As a first study, we administered tests in a cross section of the schools of the sanatorium district. The Pirquet test was used. Results were strikingly different from previous reports.

Only 10 per cent of the school population was found to be infected with the disease. On the other hand, among children coming from homes where there had been tuberculosis or where there was a history of contact, 80 per cent reacted to tuberculin. These findings were reported at the thirty-first annual meeting of the National Tuberculosis Association at Atlanta in 1924.

Our findings did not win immediate acceptance. Until other similar studies had been made, many authorities in the field refused to believe that so low an infection rate was possible. We had, however, taken the first big step toward proving the value of the tuberculin test as a screening device in school populations.

One interesting observation during this first testing venture was the fact that when one mem-

ber of the family reacted, there were often other reactors. This led us to look for a common source of infection.

It was also interesting to note how often a local physician, upon seeing a positive reaction after a test was read, would comment: "I know where he got it. He has an uncle, aunt, sister, or someone else in the family whom I took care of."

TUBERCULIN TESTING IN SCHOOLS

When tuberculin testing began in the schools, it was often difficult to get parents to consent to have their children tested. The public had to be educated. We, therefore, started our program in areas in which the physicians and the lay people were enthusiastic and cooperative. In our first testing attempt, we could report little better than a 75 per cent response. This is far below the 95 to 100 per cent participation which we have had in recent years, but it was an excellent start. With a good beginning, we built up to the point where, in most schools, the only children who did not participate were those who were absent on the day tests were given.

The schools in one of the largest towns of the district was one of the last to be included in the tuberculin testing program. One of the school board members was a chiropractor who violently opposed anything resembling "inoculation." We made no attempt to fight this individual, as we were sure the time would come when the school would demand a program. We did not have long to wait. A teacher and a high school pupil came down with tuberculosis. There was an urgent request for a testing survey, and the chiropractor was dropped from the board. Testing at that school became a regular procedure, with almost 100 per cent participation.

The program in the district has consisted of offering the test each year to selected grades—kindergarten, first grade (for those not tested in kindergarten), sixth grade, ninth grade, and twelfth grade. By conducting an annual program instead of testing the entire school every third or fourth year, we were able to maintain interest throughout our district. The yearly testing program has meant yearly tuberculosis education in these areas.

Table 1 is typical of results in a school in which a high percentage of the pupils take the test. It also indicates that the "fear of the needle" argument against tuberculin testing has been greatly exaggerated.

As the testing program attracted more and more attention throughout the state and nation, questions arose regarding various tests and tuberculin solutions. Studies were conducted in

TABLE 2
RESULTS OF PIRQUET AND MANTOUX TESTS, 1933

Age	Mantoux	Mantoux and Pirquet	Pirquet	Total positive	Total negative	Total tested	Per cent positive	Percentage positive Of Mantoux	Of Pirquet
6	0	6	5	11	106	117	9.4	5.1	9.4
7	3	4	0	7	71	78	8.9	8.9	5.1
8	2	2	3	7	72	79	8.8	5	6.3
9	1	3	3	7	81	88	7.9	4.5	6.8
10	3	2	5	10	70	80	12.5	6.2	8.7
11	2	2	2	6	67	73	8.2	5.5	5.5
12	1	4	0	5	69	74	6.7	6.7	5.4
13	3	4	5	12	59	71	16.9	9.8	12.7
14	1	4	3	8	71	79	10.1	6.3	8.8
15	10	9	0	19	70	89	21.3	21.3	10.1
16	8	9	3	20	64	84	23.8	20.2	14.3
17	4	5	0	9	35	44	20.5	20.5	11.3
18	4	9	0	13	37	50	26	26	18
	4.2	6.3	2.88						
Per Cent	10.4		9.15	134	872	1,006	13.3		
Average age 14			10.6						
	13.1		12						

our district to (1) help make our own programs more effective and accurate and (2) provide information for tuberculosis workers in other parts of the nation. These studies became a "side benefit"—a "frosting on the cake."

Table 2 shows the results of a comparative study of the Pirquet and Mantoux tests. Subsequently, the Mantoux test was used in all of our programs.

Table 3 shows results of testing large numbers of children with both original tuberculin and purified protein derivative. The study revealed little difference in reactions to the two solutions of comparable strength. So far, I have not found any preparation an improvement over original tuberculin. It has proved its value, and the standard dose of 0.1 cc. of a dilution of 1:1000 is entirely satisfactory for regular school surveys.

As for direct value of school tuberculin testing programs, I believe one of the counties in the Southwestern Minnesota district illustrates best what can be done when physicians and public are well-informed, enthusiastic, and cooperative.

This "pilot" area is Lincoln County, which is largely rural with a population of about 10,000. It was the first county to request that tests be given in all of its schools.

The interest and participation of the local physicians as well as school boards, teachers, pupils, and general public were major factors in securing an all-out response. In the very first program, more than 90 per cent of the pupils

in the town schools and 85 per cent of those in rural schools lined up for testing. All reactors had chest x-ray films taken. None of the school children had clinically active tuberculosis, but follow-ups in the communities led to the discovery of several adults who had active disease. These persons were admitted to the sanatorium and made a satisfactory recovery. The county physicians soon took over the responsibility of conducting annual programs and contributed their time.

Prior to 1940, no county in Minnesota had a death rate of less than 10 per 100,000 population based on the previous five-year average. In 1940, 4 counties had reduced their death toll below 10. Lincoln and 1 other of these 4 counties were among the 8 of our sanatorium district.

COUNTY ACCREDITATION

As an inducement to all counties and based on the county-by-county tuberculosis control program so successfully carried on by the veterinarians, the leaders of our state's tuberculosis program decided to establish a standard for county accreditation. The project was sponsored by the Minnesota State Medical Association, Minnesota Department of Health, and Minnesota Tuberculosis and Health Association.

Following are the accreditation requirements:

1. The county's tuberculosis death rate must be 10 or less per 100,000 population for a five-year period.

2. At least 90 per cent of the high school seniors must be tuberculin tested with not more than 10 per cent reactors.

Lincoln was the first county in Minnesota to meet these requirements and first in the nation to be officially accredited for control of human tuberculosis. The ceremony took place December 11, 1941. Since that time, 67 of Minnesota's 87 counties have qualified. The death rate is now down to the required 10 or lower in all

counties. Some of them, however, have not yet succeeded in testing 90 per cent of their seniors or, in one or two instances, have too high an infection rate among the twelfth grade students.

COUNTY SURVEYS

Accredited rating did not end tuberculosis control efforts. In 1951, Lincoln County did the first complete county-wide tuberculin testing survey for all persons from 6 years old to 80 and

TABLE 3
COMPARATIVE STUDY OF O.T. AND P.P.D., 1936-1938

Group I										
Dose O.T. - 0.1 mg.			Dose P.P.D. - .00002 mg.							
Sex	Age	Test	T.T.	Negative	Positive	Per cent positive	1+	2+	3+	4+
Male	5 - 10	O.T.	124	117	7	5.6	4	2	3	
		P.P.D.	124	118	6	4.6	4	2	1	
	10 - 20	O.T.	387	342	45	11.6	10	12	20	3
		P.P.D.	387	347	40	10.3	25	13	2	
Female	5 - 10	O.T.	115	113	2	1.7	1		1	
		P.P.D.	115	113	2	1.7	1	1		
	10 - 20	O.T.	477	432	45	9.4	12	18	15	
		P.P.D.	477	443	34	7.1	21	13		
Total 1,103										
Group II										
Dose O.T. - 0.1 mg.			Dose P.P.D. - .0005 mg.							
Sex	Age	Test	T.T.	Negative	Positive	Per cent positive	1+	2+	3+	4+
Male	5 - 10	O.T.	664	651	13	1.9	9	2	2	
		P.P.D.	664	653	11	1.6	8	2	1	
	10 - 20	O.T.	816	769	47	5.7	13	21	13	
		P.P.D.	816	770	46	5.6	14	19	13	
Female	5 - 10	O.T.	706	678	22	3.1	10	7	4	1
		P.P.D.	706	678	22	3.1	12	5	4	1
	10 - 20	O.T.	890	834	56	6.2	9	18	28	1
		P.P.D.	890	836	54	6.0	7	20	26	1
Total 3,070										
Group III										
Dose O.T. - 0.1 mg.			Dose P.P.D. - .005 mg.							
Sex	Age	Test	T.T.	Negative	Positive	Per cent positive	1+	2+	3+	4+
Male	5 - 10	O.T.	112	102	10	8.9	5	3	2	
		P.P.D.	112	101	11	9.8	5	4	2	
	10 - 20	O.T.	136	124	12	8.8	4	6	2	
		P.P.D.	136	120	16	11.8	6	6	4	
Female	5 - 10	O.T.	150	141	9	6.0	4	2	3	
		P.P.D.	150	138	12	8.0	6	2	3	1
	10 - 20	O.T.	125	106	19	15.2	8	6	6	
		P.P.D.	125	104	21	16.8	8	4	9	
Total 523										

over. When county physicians and community leaders requested the survey, workers from the state Christmas Seal organization came to assist with organization, education, and publicity.

The physicians gave their services to administer tests. Dozens of volunteer workers attended a mass meeting and then went from house to house throughout the county to explain the project and preregister all families for tests. Newspapers and the radio station in the area publicized the program. School children took special letters home to their parents. The Minnesota Department of Health provided services of a mobile x-ray unit for tuberculin reactors. Those with abnormal findings on the small films had 14x17 x-ray films taken at the sanatorium or in their doctors' offices.

During the survey period, 71 per cent of the available population responded for tests. Because of the widespread interest, many others went to their doctors' offices to be tested even after the survey was officially over.

School administrators reported that 95 per cent of the school-age children participated and that 2.43 per cent reacted to tuberculin. We do not have complete figures on school testing, which was organized by the schools themselves. In a study on findings, our age breakdown is available only for the 3,686 persons registered at community testing centers (table 4). Of the entire group, about 20 per cent reacted to tuberculin. However, among those over 60 years of age, 1 in 2 was a reactor.

X-ray films of reactors and follow-up examinations did not uncover a single clinical case. This does not mean the program was a failure. Work done year after year in this county has paid big dividends. In 1919, Lincoln County had 8 deaths from tuberculosis. During the past nine years, there has been no death from tuberculosis in this county. Tuberculin testing is continuing in the schools, and county health leaders know they cannot stop until the goal of complete eradication is reached.

Following the lead of Lincoln County, 2 others in the district have had county-wide tuberculin testing programs. In 1953, Lyon County had a total of 14,177 participants—about 79 per cent of the eligible population. Infection rates by ages are shown in table 5. All testing was done by Dr. Kathleen B. Jordan, of Granite Falls, who is field physician for the state tuberculosis organization.

In 1957, in Cottonwood County, 11,436 persons participated, which was about a 75 per cent response. Here, the local physicians administered tests. Table 6 shows the results.

TABLE 4
LINCOLN COUNTY TUBERCULIN TESTING SURVEY, 1951

Ages	No. tested	Reactors	Percentage
6-10	56	2	3.57
11-15	42	6	14.28
16-20	185	23	12.37
21-30	703	107	15.07
31-40	878	222	25.28
41-50	699	235	33.62
51-60	596	262	43.96
61-70	389	202	51.92
71-80	109	54	49.54
80+	17	9	52.94

TABLE 5
LYON COUNTY TUBERCULIN TESTING, 1953

<i>Results of Lyon County School Survey</i>				
Grades	Total tested	Reactors this year	Total reactors	Per cent total reactors
Preschool	222	2	3	1.35
1-6	2,700	66	73	2.70
7-9	1,169	56	59	5.04
10-11	660	42	50	7.57
12	274	18	20	7.29
Grand total	5,025	184	205	4.08 (average)

County-Wide Tuberculin Testing Survey

				Men
				No.
Ages	No. tested	reactors	Percentage	
10-19	124	20	16.1	
20-29	649	164	25.28	
30-39	1,155	323	38.8	
40-49	888	356	40.0	
50-59	574	285	47.7	
60-69	396	235	59.3	
70-79	163	89	54.6	
80-89	31	14	45.1	
				Women
				No.
Ages	No. tested	reactors	Percentage	
10-19	177	26	14.68	
20-29	989	177	17.9	
30-39	1,218	250	20.52	
40-49	927	320	34.41	
50-59	648	286	44.1	
60-69	411	209	50.8	
70-79	156	80	51.2	
80-89	34	12	35.2	

In all the surveys, 0.1 cc. of 1:1000 original tuberculin solution was used. In all, there was a remarkable similarity in the percentages of reactors for every age group. We can now estimate that in most of rural Minnesota, about 20 per cent of the population harbors the germs of tuberculosis and that, among adults, the infection rate is about 30 per cent.

During the years the sanatorium was in operation, 4 additional counties applied and were admitted to the district. In recent years, these counties provided most of the sanatorium patients. It is interesting to note, however, that as their patient loads declined, it was groups in 3 of these 4 counties who initiated the move to

have the sanatorium closed. In the original 8 counties, which could be said to have "controlled" tuberculosis down to a level that many would consider an "irreducible minimum," many of the physicians and public health leaders were convinced that the sanatorium still had a major role to play as a tuberculosis control center for the district.

What is the future of tuberculosis control in these and other areas of Minnesota? Should school tuberculin testing surveys be continued in communities in which the infection rate is below 2 per cent?

Tuberculin testing in the schools actually becomes of greater value as the number of reactors

TABLE 6
COTTONWOOD COUNTY TUBERCULIN TESTING, 1957

<i>Infection Percentages By Ages</i>							
<i>Women:</i>							
<i>Ages</i>	<i>Total tested</i>	<i>Positives</i>	<i>Percentage</i>	<i>Previous positives</i>	<i>Total positives</i>	<i>Total participation</i>	<i>Infection percentage</i>
No age	19	2	10.53	1	3	20	15.00
1 - 4	550	6	1.09	1	7	551	1.27
5 - 9	789	11	1.39		11	789	1.39
10 - 14	722	30	4.17		30	722	4.17
15 - 19	486	25	5.14	2	27	488	5.53
20 - 24	243	17	6.99	7	24	250	9.60
25 - 29	331	36	10.88	8	44	339	12.97
30 - 39	665	98	14.74	35	133	700	19.00
40 - 49	782	136	17.39	30	166	812	20.44
50 - 59	539	149	27.64	12	161	551	29.21
60+	546	182	33.33	10	192	556	34.60
Total	5,672	692	12.10	106	798	5,778	13.81
<i>Men:</i>							
<i>Ages</i>	<i>Total tested</i>	<i>Positives</i>	<i>Percentage</i>	<i>Previous positives</i>	<i>Total positives</i>	<i>Total participation</i>	<i>Infection percentage</i>
No age	18	7	38.88		7	18	38.88
1 - 4	550	4	00.72		4	550	00.72
5 - 9	847	12	1.41	4	16	851	1.88
10 - 14	755	25	3.31	2	27	757	3.56
15 - 19	465	24	5.16	4	28	469	5.96
20 - 24	205	13	6.34	3	16	208	7.69
25 - 29	317	31	9.77	4	35	321	10.90
30 - 39	697	117	16.78	13	130	710	18.30
40 - 49	644	160	24.84	16	176	660	26.66
50 - 59	571	208	36.42	14	222	585	37.94
60+	521	214	41.07	8	222	529	41.96
Total	5,590	815	14.57	68	883	5,658	15.60

is reduced. The school survey is our best index to tuberculosis in the community. When no child reacts to tuberculin, we can feel fairly confident that there is no active case of tuberculosis spreading infection. On the other hand, discovery of even one new reactor among school children should lead to an intensive search among that child's family, associates, and community for the adult source of infection. If we are ever to eradicate tuberculosis, we must find and watch the persons who are harboring tubercle bacilli in their bodies. More than that, we must, whenever possible, find and isolate the individuals who have infected the tuberculin reactors.

We should emphasize here that tuberculin testing must not be confined to school surveys. The test is an invaluable aid not only in the discovery of unsuspected cases of tuberculosis but also in ruling out the disease. The physician should include it as part of any examination, particularly, if a chest disease is suspected.

To illustrate this point, I will mention the 19-year-old girl who entered our sanatorium with a diagnosis of tuberculosis. She had symptoms of clinical tuberculosis, with cough and expectoration of bloody sputum. Her chest x-ray film showed what appeared to be a typical tuberculous cavity apex in the left lung. We could, however, find no germs of tuberculosis in the sputum, and her tuberculin test was negative. Four brothers and sisters, who had been living with the patient in a crowded home, were tested. None of them reacted to tuberculin. Finding that her close associates were not infected convinced us that this girl did not have tuberculosis. On further study, she was found to have a lung cyst which was treated surgically. She made a complete recovery. If the tuberculin test had not been applied, this patient might have remained in the sanatorium for several months undergoing treatment for nonexistent tuberculosis.

STATUS OF THE DISTRICT SANATORIUM

Finally, what is the place of the district sanatorium in today's tuberculosis picture?

First, it is the tuberculosis control center for the area. District sanatorium medical directors in Minnesota conduct or direct tuberculin testing surveys in the schools and assist with follow-up examinations of reactors.

It is a center to which ex-patients and contacts of tuberculous patients can report for regular check-ups, including chest x-ray films. There

were only 16 patients in Southwestern Minnesota Sanatorium when it closed in 1957. However, the outpatients who came regularly for chest examinations numbered more than 100. In addition, tuberculin reactors who were found during school surveys came each year for chest x-ray films.

Many of the ex-patients and the tuberculin reactors were most faithful in reporting regularly for examinations. For example, during one of our school surveys in the early 1930's, we found 3 children in a family who reacted to tuberculin. Their father, 35 years of age, appeared and felt healthy. At first, he resented the suggestion that he should be examined because he might be the one who had infected his children. He finally agreed. The examination showed an open case of tuberculosis with involvement of both lungs. He entered the sanatorium immediately, made a good recovery, and is still well and working twenty-five years later. He and his family have had periodic examinations through the years. His children, although infected, have remained perfectly well. They should, however, continue to have annual chest x-ray films throughout their lives.

At present, 178 persons in the 12-county area are on the tuberculosis case register of the Minnesota Health Department. These individuals need supervision and a place where they can go for examination. Many cannot afford to consult private physicians.

The district sanatorium also serves as a consultation center for physicians in the area. When tuberculosis appears to be a possibility, the family physician in most instances sends the x-ray film of his patient to the sanatorium director for interpretation.

With the closing of sanatoriums, more and more responsibility rests on the shoulders of the general practitioners and the public health officers and nurses. It becomes their responsibility to supervise ex-patients and known and suspected tuberculosis cases. It also becomes their responsibility to take a more active part in promoting and organizing case-finding programs. Christmas Seal organizations are learning that they need additional funds to provide chest x-ray films for persons formerly examined at the sanatorium.

If case-finding efforts are relaxed, a continued chain of infection from generation to generation can be expected. Should this happen, tuberculosis will remain a major problem not just for a decade but for a century or longer.

Management of the Tuberculous Patient Who Leaves the Hospital Against Medical Advice

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THE CONTROL OF TUBERCULOSIS continues to be a major responsibility of the community public health department and the community hospital and sanatorium. Although the tuberculosis mortality rates are dropping precipitously throughout the United States, the reported rates of new cases have shown little change during the past twenty years.¹ The advent of chemotherapeutics has had an impact upon hospital and sanatorium stay, discharge against medical advice, and other factors bearing on tuberculosis control.^{1,2} Furthermore, this new therapy has had a psychologic effect upon the attitudes of both private physicians and patients. These changes have permitted the initiation of home care programs in some locales, whereby the clinically and roentgenologically stabilized patient with conversion to bacteriologic negativity is permitted to continue his treatment at home under sanatorium or private physician management and health department control. A study of such a program in Polk County, Iowa,² revealed a more than three-fourths decline in hospitalization within two years after its initiation.

Further studies re-emphasized major factors that continue to make the diagnosis and management of tuberculosis most difficult.³ It was found that an average time lapse of three to six months occurred between the onset of symptoms and the establishment of a diagnosis. Such a delay may be attributable partly to the patient himself, who may be slow to recognize the vague symptoms of fatigue, cough, and loss of weight as manifestations of tuberculosis. In this sense, the delay may, indeed, be implicit in the disease itself. The diagnosis of active tuberculosis is not a simple decision to make and is troublesome for both the medical specialist and family physician.

As a result of modern therapy and management, a hitherto ignored problem in tuberculosis control has become a matter of major concern to hospitals, sanatoriums, and health departments. The recalcitrant, or noncooperative pa-

tient, is making his presence felt. We are now forced to acknowledge our responsibility toward him.⁴ His importance is highlighted by the fact that a national conference was recently held in Denver to consider what to do with him.⁵ In the general discussion of the subject and its ramifications, the conference expressed widely divergent opinions concerning the definition, importance of, and the approach to the problem. During a conference on this same subject in Des Moines, Iowa, in 1956, Dr. Leon Galinsky commented that there were times when he considered that it would be propitious to transfer his tuberculosis service to psychiatry and that he would act as tuberculosis consultant. An intimate liaison between these two hospital services emphasized the importance of treating people's problems, not just tuberculosis.⁶

The remarkable advances in medical and hospital care have further complicated tuberculosis control. This disease is becoming a relatively serious problem of our aged population, especially single men.¹ In addition, case finding that probes into the jailed and transient groups shows surprising results.⁷ There has been a wondrous change in the attitude of people toward most illnesses. From dread, their response has changed to annoyance and from "Will I get well?" to "Why so long, Doctor?"⁸ Miracles are expected by patients and also by physicians.

The individual with active tuberculosis, whether cooperative or not, is a mutual responsibility of his physician, the official public health agency, and the hospital or sanatorium. The recalcitrant patient was used as an illustration of the present status of management by hospitals and sanatoriums that admit and treat the tuberculous patient as well as their attitudes toward him. It was considered that this specific area would demonstrate a stressful responsibility in preventive medicine, a major function of the hospital.⁹

The present management of the recalcitrant tuberculous patient by hospitals and sanatoriums and the institutional and community facilities available for his control are the subject of this study. The cooperation of the Tuberculosis In-

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stitute of Chicago and Cook County made this investigation possible. With their counsel, a questionnaire was evolved and sent to all the sanatoriums and hospitals in the continental United States listed by the United States Public Health Service¹⁰ and the American Hospital Association¹¹ as having beds for tuberculous patients. Federal institutions were not included, since they are not subject to state or local laws and regulations in these matters.¹²

The data were limited to the year 1957 and were concerned with 5 broad areas. New admissions, average daily census, and the number on the waiting list were ascertained. The methods for control of the recalcitrant were elicited. Of importance were official attitudes toward him and his management. The availability of home care programs was queried. Last, the legal responsibility of the institution as well as the physician toward the infectious patient who leaves against medical advice was determined. In this regard, the public health statutes and regulations of each state were also obtained. A recent survey by the National Tuberculosis Association revealed that many states considered special regulations somehow necessary.¹³ However, their availability did not presage their use.

A total of 495 questionnaires was sent to the selected general hospitals and sanatoriums. Replies were received from 154 of the 193 hospitals, 80 per cent, and 254 answers from 302 sanatoriums, 84.1 per cent, a grand total of 82.4 per cent.

It was ascertained that 52 of the replying general hospitals did not knowingly accept a patient with active tuberculosis except for specific surgery. These hospitals made immediate arrangements to transfer to a sanatorium any patient found to have active tuberculous disease. Twelve sanatoriums had either recently discontinued the care of tuberculous patients or had ceased to exist. Therefore, information was available from 102 general hospitals and 242 sanatoriums, a total of 344 institutions. The questionnaire specifically asked 9 questions. All data were tabulated by state and then by regions comparable to the areas utilized by the Bureau of the Census for Compilations of Vital Statistics. These data and summations of answers to each question will be available with reprints.

The answers to question 1, "Do such patients [tuberculous] in your institution sign out against medical advice?" were almost unanimously "yes." The few negative answers were from general hospitals. Several institutions stated that a patient wishing to leave against advice is not permitted to sign out; he must walk out. This vari-

ance was included with the affirmative group. A subsequent query concerned with the numbers and categories of such persons will be published later.

Question 2, "Is there a home care program available in your community whereby such a person or any patient with active tuberculosis continues with specific therapy under medical supervision in their own homes?" This implies investigation to ensure an adequate home environment and supervision for continuity of therapy. If available, who supervises the program?" The replies showed gross differences within states and areas. Some comments suggested that home care was not efficiently organized and that it was a public health or sanatorium nurse who tried to persuade compliance. Many affirmative answers explained that the program consisted of turning a patient over to either the health department or family physician. Since the majority of institutions just answered yes or no, the validity of the affirmative group may be questionable. Theory is seemingly assumed to be reality in many areas. It is evident that the question of both extent as well as quality of home care programs is an unanswerable variant and a major study in itself.

Question 3, "Does your hospital have any legal responsibility if such a patient leaves against medical advice?" and question 4, "Does the patient's physician have any legal responsibility if such a patient leaves against his advice?" evinced answers that had little relationship to the presence or absence of health department regulations pertinent to these questions.

Data from state health departments showed lack of information by some institutions in most states. It is of interest that a great majority of institutions replied negatively to both questions except for hospitals in New York and California and sanatoriums in Indiana and North Carolina. Assuming that active tuberculous infection is an important communicable disease and that a hue and cry would instantly arise if an individual with any other communicable disease, such as typhoid, scarlet fever, leprosy, or even measles, left confinement and went about as he willed or was so permitted, the attitude of both state and local health departments as well as sanatoriums is inexplicable. Some states had "working agreements;" some thought that there was a law but found none. The major question that arose from this facet of the study is the continuing peculiar status of tuberculosis. It alone seems to require special laws to legalize its acknowledged importance.

Question 5, "Are this person's local and/or

state public health authorities promptly notified, by whom, and what happens?" showed that 24 per cent of all institutions had no idea of what occurred in their community when an infectious tuberculous patient went back home.

A total of 20 per cent of institutions followed such patients with their own personnel to initiate whatever persuasion and persistence can accomplish. Almost every institution immediately notifies the public health agency. The results varied from court action, if necessary, to return the patient to the institution through varying degrees of persuasion down to nothing.

Answers to question 6, "If there are legal procedures available to keep this person within your institution, are they utilized by you or by the health department?" showed that such procedures were initiated by health departments to a greater extent than by the institutions.

Again, there was no specific relationship to state regulations or even to facilities for care if the recalcitrant patient is committed to the institution.

Question 7, "Do you have facilities for his care if restrained by court order?" indicates that the area with the greater percentage of facilities, the Pacific, had the greater percentage of legal proceedings initiated by institutions and health departments. The area with the least ratio of facilities, the East South Central, had the corresponding least percentage of legal proceedings initiated by anyone. The exception was the Middle Atlantic group, with a percentage of legal proceedings promulgated greater than the ratio of facilities available. An important fact was that some sort of proceedings were initiated by many institutions in an attempt to persuade the tuberculous patient to willingly continue necessary therapy in the institution irrespective of the presence or absence of facilities for his care.

Question 8 asked "Number of new cases admitted during 1957, average daily tuberculosis patient population, and number on waiting list?" The figures available as to admissions and average daily census for 1957 re-emphasize the continuing importance of tuberculosis as a community, health department, and hospital problem. Certainly 66,748 admissions in 82 per cent of the total of institutions replying is still considerable.

There is a pointed reminder of the job not accomplished. As with another social disease, gonorrhea, an effective chemotherapeutic does not per se control the disease.¹⁴

Furthermore, the duration of therapy necessary to both eliminate infection as well as disease with presently acceptable therapy is markedly

variable when scarlet fever, for example, is compared to tuberculosis.

A recent editorial in the *Journal of the American Medical Association*¹⁵ emphasizes the necessity for a clarification of the role of the practicing physician in the treatment of the infectious tuberculous patient in the latter's home. It should be evident that when a family physician treats an infectious patient at home or in the office, he assumes responsibility for ensuring the protection of the patient's family and community. This requires intimate liaison by the private physician and the local health department as a mutual responsibility to patient and community. Another recent editorial in the *Journal of the American Medical Association*¹⁶ emphasized this fact in commenting on a recent immigration regulation permitting aliens with active tuberculous disease to enter this country.

A present attitude, the subordination of the microbiologic to the roentgenographic aspects of the tuberculous infection and disease, is evidenced by the usual evaluation of the results of chemotherapy in terms of changes in the chest x-ray film. Perhaps, as a result of the pronounced decrease in the utilization of bacteriology for other infections we now treat with chemotherapeutics, it has been forgotten that the laboratory evaluation must remain a necessity, since present therapy still takes many weeks or months to render patients noninfectious.¹⁷ This factor further emphasizes the tenuousness of the initiation of home or ambulatory treatment of individuals with infectious tuberculosis unless coordination with the local health authority can be effective.

The encouraging statistic in answer to question 8 was the relatively small number of individuals on institutional waiting lists. There was a total of only 1,122, plus an undetermined number from one sanatorium in Alabama.

Question 9, "Would you please comment upon the hospital's responsibilities toward the patient committed as well as the patient who is admitted with possible or definite active tuberculous disease?" This, of course, would be especially appreciated." This question was added as a means of ascertaining the attitude of hospital and sanatorium directors toward this problem. The replies can be categorized into 5 main responses.

1. The same care for the cooperative and non-cooperative patient was emphasized. Many with this type of response added that cure of the disease was the institution's responsibility. The impression was gained that difficult behavior was not held against patients. Selected comments by respondents will be available with reprints.

2. Some replies can be described as the "lock-them-up or get-rid-of-them" philosophy. The latter was in evidence in a great majority of general hospitals except in New York City and Des Moines, Iowa. A few sanatoriums revealed that their states had institutions with facilities for restraining such individuals. Some replied that they believed that lockups would be the solution to the problem.

3. An encouraging number of institutions made a point of the need of educating these patients, since they were not the same as the cooperative patients. There was some understanding of the varying degrees of impact that tuberculosis had upon people. Some felt responsibility over and above just adequate treatment of the disease. One or two of the following adjuncts were considered necessary: social service, integration with community welfare agencies, occupational therapy, or counseling services.

4. This too small group spelled out the complete program. Aware that recalcitrance can cause recalcitrants in either patients or physicians and that a patient's actions may be manifestations of social and family pressures, institutions in this group have re-evaluated and realigned their own attitudes as well as programs. There is organization within these institutions, utilizing all required specialties, and coordination with community facilities for maximum care of the patient and his family.

5. This category includes institutions which have nothing but a feeling of futility. Some blamed disorganized community efforts, some felt that the fault lay with inadequate official public health agencies, and some accused the practicing physician. This feeling of frustration probably results in and is a result of poor understanding and programing on the part of the community.

An over-all review of the questionnaires returned revealed patterns but no uniformity either within states or regions. No state or region had a monopoly upon recalcitrant patients or personnel. The patterns were probably a result of the personalities and characteristics of institutional staffs rather than the patients therein. Nowhere is there either Utopia or Gethsemane.

The relationship of the hospital and sanatorium to the official health agency is evidently the serious problem in many areas. Preventive medicine, which is the fundamental function of both the health department and the hospital, is involved in the study under discussion. As has been succinctly stated by Dr. Crosby,⁹ "It is in this area (preventive medicine) that the mutual

interests of the health department and the hospital merge. Both the health department and the hospital want to prevent illness and reduce disability among members of the community. In their mutual interest in prevention, both organizations unite forces. The hospitals observe the health principles promulgated by the health department, and the health department assists in caring for some patients for the hospital. In their cooperative interaction, hospitals perform public health functions and health departments discharge hospital functions. In short, a mutual understanding of each organization's joint responsibility is fairly well accepted today."

No one disagrees or disputes. However, this study suggests a gap of varying dimensions between hospitals, sanatoriums, and their health departments throughout the United States. The control of tuberculosis is no new mutual responsibility or program. There is an undertone of no one knowing what anyone else is doing in far too many states. To point the finger of blame would frequently mean its being crooked. To acknowledge the state of mutual misunderstanding and lack of communication is a basic requirement to corrective action.

One method of assisting collective planning previously suggested was to appoint the community's full-time director of public health to the board of the community hospital or at least utilize him in a consultative capacity.¹⁸ In any event, the integration of both nonprofit and tax supported hospital and sanatorium services requires not just looking into the community over institutional parapets but rather "mingling with the crowd."

The patient with tuberculosis, as a person capable of infinite variations in his reactions to his disease, is an example of the responsibility of the community hospital and sanatorium in preventive medicine. Irrespective of the presence or absence of organized community public health, the institution that accepts such individuals must fulfill its responsibilities to itself as well as to its patients. The basic responsibility rests with the official health department. No less important is the practitioner of medicine who has as a fundamental tenet to do no harm.

The study suggests that each hospital and sanatorium as well as local and state health departments must examine individually and together their programs, plans, and attitudes. Since all health professions, agencies, and institutions are now actually and officially involved in health maintenance, it would do well for all concerned to re-evaluate an old responsibility—the management and control of tuberculosis.

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IN SELECTING A PROPER ANTIBIOTIC for the treatment of bacterial infections, antibiotic sensitivity tests are less important criteria than the clinical diagnosis, isolation of the causative organisms, and knowledge of the properties of specific antibiotics. Difficulty in standardization and control of disk antibiotic sensitivity test methods warrants caution in interpreting results with regard to therapy.

A survey study of commercial disk antibiotic sensitivity test methods was done in 9 teaching hospitals using 5 strains each of 5 different genera of bacteria. Five to 10 antibiotics were tested against each strain.

Variations in the results of disk sensitivity tests of the same organisms and antibiotics by different hospital bacteriologic laboratories were significant. Comparison of results by a tube dilution test with survey disk tests suggested that the results of the latter generally tend to indicate greater sensitivity of the strains. This was more often true with chloramphenicol and streptomycin than with polymyxin B and the tetracycline analogues. Discrepancies between the results of disk and tube tests also occurred in relation to different genera of bacteria. Over-all discrepancies of major order between disk and tube methods were observed in 20 per cent of tests. Within the limits used for comparison in the study, the tube dilution test was uniformly reproducible.

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The Cold War

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WE HAVE ALL BECOME INDOCTRINATED to the cold war. This is a phenomenon that has occurred in recent times when nations of different ideologies are actually at war without the exchange of gunfire. The cold war is maintained within bounds by reason of great deterrent force—military and economic strength—which make attack unlikely and unsuccessful. In the place of open attack, however, new areas of warfare have been developed, such as social, economic, and political. These newer forms of warfare may also be highly effective. The mobilization on the part of the great nations of all of their resources to prevent an unwarranted hostile attack has kept these differences of ideology within bounds. It is true that skirmishes and battle activity develop, but the presence and exertion of deterrent forces soon limit these activities and bring a cessation to the hostilities.

With the advent of the cold war, we have had a change in our thinking. Many are firm believers in the deterrent force as the rule of the big stick. There are others who believe in appeasement, hoping thereby to satisfy their opponents. Others hope that by granting small concessions, open warfare may occasionally be avoided. People who have studied the cold war are almost uniform in their belief that the presence of a determined, unrelenting deterrent force is the most effective weapon in our fight in the cold war.

Just as we have an international cold war, so we are having a cold war in one of our greatest areas of public health. This cold war finds us facing one of the most determined, insidious, and effective enemies in the history of mankind, namely, *tuberculosis*. Just as the cold warfare is fought with different political and economic weapons, so the tubercle bacillus fights its war in devious ways. Rarely does the tubercle bacillus attempt an overt onslaught against the human race or the animal kingdom. Its offensive weapon is insidious infiltration without awareness of the enemy until overwhelmed by the infection. Why are we at this time involved in

cold warfare with tuberculosis when just a few years ago we were involved in a shooting war against it? Many factors have brought us to this present plight.

The problem of tuberculosis in Minnesota can well illustrate the changes that have occurred in the management of tuberculosis. Early in the history of our state, we were so impressed by its climate that we invited the victims of tuberculosis to come to Minnesota for their health. These invitations resulted in widespread and, ultimately, epidemic tuberculosis throughout the state. It was marked by a high mortality rate, an extremely high infection rate, and, in all probability, everyone had a positive tuberculin reaction. There is no way at this time to estimate the tremendous cost to the state from this invitation. The mortality rate neither reflected the morbidity rate nor did it in any way reflect the high infection rate. Tuberculosis became such a common problem that, in some areas, one accepted the disease as a natural course of events and expected sooner or later to be infected by the tubercle bacillus. The individual's hope was that he would not develop clinical tuberculosis. Many people refused to accept tuberculosis as a natural event and began to mobilize forces to overcome the dread epidemic.

FACTORS CONTRIBUTING TO TUBERCULOSIS CONTROL

The development of the Christmas Seal movement was one of the great factors in our fight against tuberculosis. Through the association of lay and professional people, whose interest rested in conquering tuberculosis, the seal movement progressed rapidly. The expenditure of its funds in lay and professional education as well as research aided greatly in the fight against this disease. Over the period of some fifty-odd years, its impact against tuberculosis and on health in general has been immeasurable. This organization has without question been one of the prime factors in the control of tuberculosis. Through its efforts not only were people alerted concerning tuberculosis but physicians were trained in the diagnosis and treatment of the disease, and, with lay support, many communi-

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ty services developed, which assisted greatly in case finding and tuberculin testing.

The general recognition of the fact that tuberculosis is an infectious disease spread from person to person and resulted in the tuberculosis sanatorium program. The individual who suffered from open infectious tuberculosis could be treated for his disease, and, at the same time, he was removed from the community and was no longer a source of infection. The health departments—federal, state, and local—with their associated agencies were extremely active in the development of these sanatoriums and were also active in following and examining the contacts of these persons with known cases of tuberculosis.

The veterinarians realized their responsibility in the control of tuberculosis, and, through their program, the eradication of the disease in cattle was realized. This program was augmented by the veterinarian's inspections at the slaughter houses and through legislative action that resulted in the pasteurization of milk and so forth. As a result of these activities, bovine tuberculosis is now practically unknown in human beings.

The nursing profession was among the first to become active in the fight against tuberculosis. Through its intimate contacts with people, it put across the message of the Christmas Seal and of the voluntary health agencies. This profession vitally assisted public health agencies in the battle against tuberculosis.

Research workers were ultimately able to assist in the treatment of tuberculosis. Patients confined to beds in sanatoriums were soon treated by artificial pneumothorax and other surgical forms of therapy, such as phrenic nerve operations, thoracoplasties, and variations of these types of surgical procedures. The development of drug treatment assisted greatly in the fight against tuberculosis. Today, many patients are discharged from the sanatorium months and years before their expected discharge, and many patients have returned to a normal community life by virtue of drug treatment.

Legislative bodies saw their responsibility in the battle against tuberculosis and gave funds that made it possible for all of the official agencies to carry on their work in the control of this dread disease.

There are a great many other agencies and groups that should be mentioned, but time and space do not permit. Suffice it to say that as a result of the combined efforts of the family physician, the medical association in conjunction with lay and other professional workers, plus all of the health agencies we today find our-

selves in a very unique position. The tuberculin testing programs throughout this area indicate that instead of widespread infection born of the tubercle bacillus, children of school age have a very low rate of infection. Children of high school age have a slightly higher rate, and individuals past the age of 50 still have an infection rate of about 50 per cent. The tuberculin test has now become the important epidemiologic tool in case finding and in the diagnosis of tuberculosis.

The development of the mass x-ray survey programs has resulted in finding many individuals not only with tuberculosis but with other chest diseases and has enabled us to rapidly isolate people with visible evidence of tuberculosis. This program has now been pinpointed to certain areas which pay a larger dividend in case finding. The development of the program of taking routine chest x-ray films of patients on admission to the hospital has also aided in the control of tuberculosis and has protected the professional personnel as well as the patients from this dread disease. The result again is a further decrease in the incidence of open infectious tuberculosis and a subsequent decrease in the infection among the people in our area. The case-finding program has resulted in admitting patients to the sanatorium earlier and earlier for treatment. The use of the drugs and surgical procedures has resulted in shorter periods of hospitalization. Today, our sanatorium beds are less needed for the tuberculosis patient than before, and many sanatoriums are being closed or the beds converted to other uses.

FALSE SECURITY

This tremendous decrease in the infection rate, closed sanatoriums, and the like have led us to a false sense of security concerning tuberculosis. These changes are the result of some fifty-odd years of effort in the battle against tuberculosis. Now we find that people are no longer interested in this war. They feel that victory has been achieved and that tuberculosis is controlled even though it is not eradicated.

Tuberculosis has not been entirely controlled, let alone eradicated. At present, approximately one-third of our population have active, living tubercle bacilli in their bodies. Year after year, open clinical infectious tuberculosis develops in a certain per cent of this group. If these individuals are not discovered sufficiently early, they will spread the infection and the infection rate will mount rapidly. The control of this infectious disease is entirely dependent upon case finding. As long as there is one positive tuber-

culin reactor in the world, tuberculosis has not been controlled.

We also labor under a false sense of security concerning patients who have been returned to their homes from sanatoriums under the umbrella of drug treatment. Here again, we are totally uncertain concerning the long-term effect of these drugs and how many of these people may develop resistant strains of organisms which, when they affect others, will make it impossible to cure the new victim. We are totally insecure at this time as to the over-all results of our newer forms of resection surgery. The only thing about which we are certain is that *the control and ultimate eradication of tuberculosis is dependent upon finding the open, active infectious case; isolating the individual; treating him; and following his contacts. When the patient's tuberculosis is arrested, we strive to return him to a normal social and community life commensurate with his degree of recovery.* There are no shortcuts, and this program must be detailed, complete, and persistent.

The decrease in the mortality rate has seduced many people into complacency. They feel that because the death rate is low, tuberculosis is no longer a problem. This is not true. With the lower death rates and the lower infection rates, the cost and effort to find the new infectious cases of tuberculosis become greater and greater. Thus, more money is needed to continue this program.

The control of tuberculosis is no longer a problem of a single state or of the United States, and it no longer ends at the boundary of this great country. The control of tuberculosis is our responsibility on a world-wide basis. Since we find it necessary to station the members of our Armed Forces throughout the world as protection against our enemies in this cold war, it is also our duty to protect these individuals from tuberculosis. Unfortunately, many of the members of the Armed Forces are now established in countries in which tuberculosis is epidemic

and the infections are highly fatal. It serves no useful purpose for us to control tuberculosis in this country and then subject our sons and daughters to open infection while they serve the military in foreign countries to protect us against armed attack. It is now our obligation to fight tuberculosis on a world-wide basis, so that everyone in the world shall be free from this dread disease.

It must be emphasized again that despite the great gains that have been made against tuberculosis, the conflict is still a cold war. It has not been won. We are at the moment apparent victors because the great force of our social, economic, and welfare agencies has been mobilized to protect us against this disease. We have been able to keep this a cold war because of the tremendous activity of our volunteer health agencies, our public health agencies, and all the lay and professional people who are interested in this war. Just as the international cold war remains such because of the deterrent Armed Forces with their nuclear weapons stationed throughout the world, so our battle against tuberculosis is a cold war because of the deterrent forces of our will to fight. Once we begin to appease the tubercle bacillus, once we make concessions to the tubercle bacillus, once we weaken the deterrent forces against the tubercle bacillus, once we diminish our efforts in case finding or tuberculin testing or discontinue routine chest x-rays or decrease lay and professional education so vital in the control of this disease, the cold war will become a hot war and tuberculosis will again become epidemic.

In this cold war against tuberculosis, let us not be lulled into placidity or security because of the gains we have made. Instead, let us recognize that these gains are skirmishes and battles that have been won, but that the ultimate victory has not yet been reached. Our cold war, like all wars, will not be won until we have defeated tuberculosis by complete eradication and not by control.

Usefulness of Tuberculin Testing in Child Health Supervision

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A PRACTICAL PROBLEM in the life of school health workers is the identification of groups of persons who are unusual risks, in order that school health services may be focused in areas in which they can do the most good. Tuberculin testing offers this sort of much needed help. A positive tuberculin test identifies certain individuals who are risks, and, in so doing, permits mobilization of resources to sustain and promote *child, family, and community* health.

At present, in the United States, the tuberculin test has reached new usefulness. In many parts of the nation, the number of individuals who have been infected with tuberculosis has become small enough that it is now practical to identify and safeguard them.¹ Positive reactors comprise a small group, but observations² on the fate of young reactors have indicated that a high proportion of adult disease emerges from those young reactors.

Both from the standpoint of clinical pediatrics and that of public health, the fact that the group is small, and yet of long range meaning in overall tuberculosis control, makes tuberculin testing a most useful adjunct to child health supervision.

The identification creates numerous constructive possibilities, including location and care of the contact, thus reducing the likelihood of additional exposure to the patient and others.

Under certain circumstances, the child reactor might be treated, but, most significantly, the information from tuberculin testing provides an opportunity to supply supportive care for the individual child during periods of stress and to mobilize family and community resources.

RECENT REACTORS AND SPECIAL STRESS PERIODS

A positive tuberculin test alerts a pediatrician at any period of childhood, but the special oppor-

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tunities provided by tuberculin testing become most vivid when we consider children whose tuberculins have recently converted from negative to positive and further consider the characteristics and demands of specific growth periods.

The simplest attention to growth characteristics of various ages makes the whole subject take on lively interest. Consideration of the following three gross age divisions illustrates this variation in meaning.

1. *The child entering kindergarten or primary school* has not been in the world long, so the question of the source of his positive tuberculin is circumscribed both in length of time and in the number of persons involved. All the close contacts that many children of kindergarten age have ever had could be fairly quickly catalogued, and, even in children who have moved often and known many people, there is a strong possibility that they may still be in contact with the source of infection and be receiving additional exposure.

Exposure at the preschool and primary school age, when it exists at all, is apt to be heavy because the interpersonal contacts in young children's lives are close and intimate, such as a little child with his mother or a beloved grandfather.

As for physiologic stresses of the period, growth is less rapid than in infancy but still going on at a rate that places heavy demands on a young body, and developmental strains take further toll, for these children are striving to master large muscles and general body mechanics and spend their waking hours in almost incessant strenuous exertion — running, jumping, climbing, and engaging in other activities necessary for motor development but costly in energy outlay.

Added to these strains, these primary school children are leaving behind many of the supports of infancy, although they have many of the physical needs of babyhood. They still need naps and substantial feedings, but have arrived at an excited, outgoing age and are too busy to bother with either.

2. *The child in elementary school* presents a

different situation. His contacts at home are not quite as close as those of the younger child, but he still has considerable intimacy, particularly with the mother, and perhaps with elderly relatives.

These elementary school children are further endangered by acute communicable diseases. They are at an age when measles, mumps, and chickenpox strike, as do innumerable respiratory infections. These illnesses result in strenuous experiences for any child and are fraught with hazards for children whose bodies may already be coping with a tuberculous infection. To sense the potential gravity, one needs only to remember the damaging effects of measles when concurrent with tuberculosis in childhood.

The nutritional demands of the elementary school children require attention. The rate of linear growth is slowing, but these children are filling out and becoming stockier, and they are highly active in their attempts to keep up with other children in strenuous games and sports. In addition, they are getting ready physiologically for the next big push of childhood—the pre-adolescent growth spurt, which is followed by the subsequent demands of adolescence.

3. *Adolescence* is the stage in which both the child himself and his relationship to tuberculosis change conspicuously, and the adult form of tuberculosis increases abruptly.³ Perhaps growth strains are responsible for these changes, and perhaps the onset of the menstrual periods is a special hazard. Certainly, the changed picture of the disease shows up earlier and more severely in the adolescent girl than in the boy.

The girl is vulnerable in many ways. She is at an age when her physical strengths are called upon to meet the needs of her daily activities and her own growth and development—including the newly established menses—while at the same time attempts are made to establish and maintain reserves to be drawn on shortly for her pregnancies.

In the United States, the average age at which a girl first marries is now about 18, which means that when we are serving the adolescent girl, we are often serving the pre-prenatal girl, and any special help we give her may stand her in good stead during childbearing demands within the next few years.

Thus, although each of these age periods is a normal era of child's growth and development, each has its own special forms of natural stress and strain. A positive tuberculin test identifies individual children who might be special risks when going through those normal stress periods. Once alerted by the positive tuberculin test, a

school health program can bring to bear supportive care appropriate for each child at his particular age, and school, family, and community strengths can be used and reinforced where needed.

The child entering school can profit from close focus on the family aspects of the situation. Intense search can be made for the contact so likely to be still present and in need of control, and attention can be given to the child's young brothers and sisters who may have encountered the same source of infection and who certainly share his need for general child health supervision.

The elementary school child can be watched in regard to the acute communicable diseases. All immunizations can be brought up-to-date, and he can receive suitable protective care during the convalescent periods when an otherwise quiet tuberculous condition could become serious, for example, in the miliary spreads and other complications that sometimes develop after measles or whooping cough.

Children in this age group can be helped to have a full, vigorous, and normal childhood and yet be spared inappropriate strains of intensely competitive athletics. Furthermore, a thoughtful type of health supervision may fortify them for the demands of the next big growth spurt.

Adolescent opportunities are unusually good. The adolescent girl can perhaps be spared the needless strains of self-imposed nutritional damage. She is at a stage where self-consciousness and other motivations may lead her to try to "improve" herself by energetic dieting. Many girls at this age vibrate back and forth between stringent dietary curtailments, alternating with indulgent sprees of practically nothing but pure carbohydrates. Such diets are not advisable for any adolescent but have deeper meaning when the girl happens to be a recently converted reactor to tuberculin.

In view of studies⁴ indicating that the increase in adolescent tuberculosis is related to failure to meet the nutritional requirements of that critical period, it seems reasonable to believe that some concentrated health supervision at that time may tide a girl through those significant years and enable her to move on to the demands of pregnancy and childbearing with less likelihood of active tuberculosis developing in the depleted postpartum period.

The foregoing are only a few of the ways in which a positive tuberculin test can alert health workers to meet the needs of individuals of a high risk group going through predictable periods of normal stress.

Public health opportunities reach even further, for there are similar opportunities for serving the families involved, and when, for instance, many reactors occur in a given neighborhood or district, services can be mobilized for whole groups of special risk persons.

In helping families or larger groups, many modern resources can probably be brought into play, such as nutritional services and health, welfare, housing, and other forces for well-being. Once special risk children are identified, the health leadership of a school can help marshal the strengths of home and community—a vigorous and far-reaching form of school health.

SUMMARY

Tuberculin testing offers practical help to school health workers.

Each age period in childhood has its own growth and development tasks and resultant stresses.

These natural health challenges give tuberculin testing importance. Positive reactors, *especially recent converters*, can be identified as groups of special risks, and the strength of schools, homes, and communities can be mobilized in practical ways that protect the children at specific ages and promote their long-range general health and well-being.

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ACCORDING TO HEALTH INFORMATION FOUNDATION, the maternal rate in the United States has declined 93 per cent in the last four decades. One maternal death occurs in approximately 2,300 live births today, compared with 1 maternal death for each 165 live births in 1915.

Recent improvements in safety to women in childbirth are called "an almost unparalleled achievement of medical progress." Maternal factors now cause only 1/10 of 1 per cent of all deaths in this country and only 4 per cent of all deaths among women of reproductive age.

Today, at least 94 per cent of all live births in this country occur in hospitals, and 97 per cent of all babies are born with a physician in attendance.

Tuberculin Testing in Minnesota

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IN THE ENTIRE tuberculosis diagnostic armamentarium, nothing has stood the test of time as well as the tuberculin reaction. Only eight years after reporting the discovery of the tubercle bacillus, Koch announced in 1890 his development of a preparation which soon became known as original tuberculin (O.T.). The same year it received comment by the editor of *The Northwestern Lancet*.

A TEST FOR TUBERCULOSIS IN DOMESTIC ANIMALS

A young man whose father practiced medicine in Prescott, Wisconsin, spent some time at the University of Minnesota before registering in the School of Veterinary Medicine at the University of Pennsylvania. While a student there in 1892, he was invited by one of his professors, Dr. Leonard Pearson, to participate in the first tuberculin testing of cattle in this country! In that project, the specificity of the tuberculin reaction was clearly demonstrated through the discovery of lesions in nearly all cattle which reacted to tuberculin and through failure to find them in nonreactor animals.¹

Only two years after the Philadelphia demonstration, the student who had participated, Dr. Charles E. Cotton, was practicing veterinary medicine in Minneapolis. The Philadelphia demonstration had so thoroughly convinced him of the specificity and importance of the tuberculin test that he already had an enthusiasm for its extensive use. That enthusiasm continued to his dying day fifty years later.

Dr. Cotton no sooner established his veterinary office and hospital in Minneapolis than he was employed by the Minnesota Department of Health from July 1894 to September 1895 to administer tuberculin tests to cattle in this vicinity.

In 1893, Dr. C. N. Hewitt, secretary of the Minnesota State Board of Health, said that the use of tuberculin was advised and would be supplied free of charge to local boards of health to be used by physicians and veterinarians. In his biennial report, 1893-1894, Dr. Hewitt said that Dr. D. S. Salmon, chief of the United States Bureau of Animal Industry, had sent an inspector to Minnesota and requested that the

Health Department furnish a large amount of tuberculin for the diagnosis of tuberculosis in cattle. Dr. Hewitt's interest in the use of tuberculin was aroused not only by reports from other parts of the world but also by his own personal observations. From September to December 1894, the test was administered under his direction to 335 cattle. By December 31, 1894, 41 of the reactors had been slaughtered, and the examination promptly substantiated the diagnosis.

From 1895 to 1901, Dr. Cotton was city veterinarian with the Minneapolis Health Department. The city furnished free tuberculin and refused license to sell milk to anyone who did not possess a certificate showing that his cattle had been tuberculin tested and the reactors promptly eliminated. The city did not order cattle tested, but merely refused license if they were not. *This was the first city in the United States to require that milk be supplied only from tuberculin tested cows.*

The tuberculin testing program was promptly adopted by the St. Paul and Duluth areas, and then smaller cities began to enact ordinances providing for dairy products from only tuberculin negative cows.

A plan was devised for accrediting herds on the basis of freedom from tuberculin reactors. In 1903, the herd of Chapin R. Bracket, near Minneapolis, was first in the United States to be *officially accredited as a modified accredited tuberculosis free herd.*

Control of communicable diseases among animals was under the supervision of the State Board of Health until 1903 when the Minnesota State Livestock Sanitary Board was organized. An early activity of this board, of which Dr. Cotton was continuously a member, was the promotion of annual tuberculin testing of purebred herds throughout the state. In 1916, provision was made to issue certificates to owners of accredited tuberculosis free herds. These were renewed annually. When Dr. Cotton became executive secretary of the State Livestock Sanitary Board in 1919, it was obvious to informed owners of cattle everywhere that tuberculin testing was the only method of keeping herds free from

tuberculosis. In 1923, the Livestock Sanitary Board, in cooperation with the United States Bureau of Animal Industry, decided to place tuberculin testing of cattle on a county-wide basis. A county received an official certificate as a modified accredited tuberculosis free area when testing of all cattle revealed a reaction rate of not more than 0.5 per cent. Animal reactors were immediately removed from the herd. Thereafter, no bovine tuberculin reactor was permitted to enter the county.

Meeker County was first in Minnesota to meet the qualifications and was accredited on May 8, 1923. On December 1, 1934, the last of the 87 counties was accredited, and the state was officially designated a modified accredited tuberculosis free area. Since this did not mean that the tubercle bacillus had been eradicated from cattle herds, periodic testing has continued. One-sixth of the 4,000,000 cattle in Minnesota are tested each year, so that the complete round is made every six years.

The percentage of tuberculin reactors has been so reduced that now approximately 5,000 cattle must be tested to find one reactor. The owner, another member of the family, a hired hand, or someone else in contact may be responsible for the infection rather than another animal. An occasional small outbreak from one testing to the next has demonstrated the importance of continuing the periodic surveys.

The total number of tuberculin tests administered to cattle of this state from 1903 to 1958 was 28,521,850. During that period, 258,606 cattle reacted and were slaughtered and examined for tuberculosis. The cost of indemnities to cattle owners of the state from 1903 to 1958 was \$4,036,069.48. In addition, the federal government contributed \$1,792,411.21.

When Dr. Cotton retired in 1942, Dr. Ralph L. West was appointed secretary and executive officer of the State Livestock Sanitary Board. Throughout the years, Dr. West has maintained a strict periodic testing program. He frequently points out that if the few reactors among cattle today were not found and properly disposed of, the disease would doubtless regain a foothold, and the results obtained by years of endeavor and heavy expenditure of public funds would be largely lost.

A. G. Karlson, D.V.M., of the Mayo Clinic,² said, "An animal that reacts positively to the tuberculin test is properly considered dangerous. . . . In spite of the great advance in control, there is a constant potential hazard as long as only a few infected animals exist."

Minnesota veterinarians and, in fact, those of

the entire nation have used original tuberculin (O.T.) ever since they began testing in 1892. For some time, the subcutaneous method of administration was employed. The ophthalmic method had limited use for awhile, but, for the most part, the intracutaneous method of administration has been employed since 1920. For cattle, the skin of the caudal fold has been the most used site of administration; however, a shaved area of skin on the side of the neck has been recommended.

The Minnesota State Livestock Sanitary Board has also used tuberculin extensively in detecting the presence of tubercle bacilli in other domestic animals, including swine, fowls, and pets. Disease develops in fowls, except parrots and canaries, only from the avian type of tubercle bacillus. In testing for infection caused by this type, the tuberculin used in testing people and cattle is not dependable. Therefore, tuberculin should be made from the avian type of tubercle bacilli for testing poultry.

Inasmuch as the avian type of tubercle bacillus also causes tuberculosis in swine and, occasionally, in people, tuberculin from this type of organism should always be used in testing animals and people when the avian type of tubercle bacillus is suspected of being responsible for the disease.

The tuberculosis eradication work among the cattle of Minnesota was a cooperative activity with the United States Bureau of Animal Industry. All of the states cooperated in a similar way. From 1917 through the fiscal year 1958, 396,687,286 tests were administered to the cattle of the United States, of which there are now approximately 95,000,000, and 4,077,995 tuberculin reactors were found, slaughtered, and given postmortem examinations.

The program has been thoroughly sound economically on a national basis. It has been estimated that in 1957, nearly 100,000 bovine carcasses would have been condemned as unfit for human food if bovine tuberculosis had remained unchecked since 1917.³ The actual number condemned was 212. On the basis of current prices, the savings on the condemnations resulting from the testing program and on the killing floor equal more than \$150,000,000 a year. The total expenditure for the eradication program over the years was \$326,000,000. Thus, in two years, the program saves almost as much as was spent for it in forty years.

The importance of the veterinarian's perpetuation of the tuberculin test among animals, regardless of how low the incidence becomes in any given species, is obvious when it is realized

that the 3 pathogenic types of tubercle bacilli: namely, human, bovine, and avian, are not pathogenic for the tissues of a single species as their names might indicate but that each causes disease in certain other animals, and all can cause serious disease in people. Thus, the attack through the tuberculin test must be on all 3 pathogenic forms of tubercle bacilli with their eradication as the ultimate goal.

A concise and accurate historic account of the bovine tuberculosis eradication campaign was recently published under the title *The Conquest of Bovine Tuberculosis in the United States*. This excellent booklet may be obtained directly from the author, Dr. Howard R. Smith, Somerset, Michigan.

A TEST FOR TUBERCULOSIS IN PEOPLE

In 1891, Dr. Talbot Jones, of St. Paul, who was in Berlin when Koch announced that he had produced tuberculin, said that, as a purely diagnostic agent, there could be no question concerning its value.⁴

Apparently, the first person in Minnesota to report on tuberculin as a diagnostic agent in man was Dr. W. J. Mayo, of Rochester, in 1894.⁴

The early promoters of the test were opposed by some colleagues. For example, Dr. J. H. Dunn, of Minneapolis, said in 1897 that only in rare cases does one need the tuberculin test, for a good clinician can usually detect the disease without it. In 1898, Dr. C. L. Green, of St. Paul, did not believe the test was infallible or that it was even safe to use in the diagnosis of tuberculosis. In 1900, Dr. J. W. Bell, of Minneapolis, said, "I have seldom found it necessary to use tuberculin in demonstrating the existence of pulmonary tuberculosis. Not that I consider it unreliable. On the contrary, I believe it is a valuable test but consider it not fully free from danger."

In 1897 and 1898, Dr. George D. Head, of Minneapolis, conducted a study seeking to prove or disprove its value as a diagnostic agent in people. From these studies, he concluded that the tuberculin test is a capable method of diagnosing insipient tuberculosis before physical signs and sputum studies are helpful. In 1905, he said, "The tuberculin test is one of the most neglected but most helpful agents at our command for detecting early lesions of tuberculosis."⁴

About the same time, Dr. H. Longstreet Taylor, of St. Paul, was convinced that nothing even approached tuberculin in accuracy in the diagnosis of tuberculosis. He said that the tuberculin test is extremely valuable in the diagnosis of

"larvate" tuberculosis, which we now call primary or first infection type.

EARLY TUBERCULIN TESTING SURVEYS

Evidently, the first survey to include tuberculin testing was done by Dr. H. G. Lampson in Minneapolis in 1910. Families were selected in each of which a person with contagious pulmonary tuberculosis had lived for at least one year prior to this investigation. The epidermal test described by Pirquet in 1907 was employed. In the 40 families with tuberculosis, 207 individuals were examined. Approximately 67 per cent reacted to tuberculin; whereas, in 15 families with no clinical tuberculosis, 80 individuals examined revealed only 2.5 per cent reactors. Thus, by a delicate method of determining the presence of infection, the contagious nature of tuberculosis was demonstrated. The results of this study were published as a bulletin by the University of Minnesota in 1913.

In 1912, Dr. Lampson made small tuberculosis surveys in several counties to study the spread of infection in families. In 97 family groups comprised of 449 individuals of all ages and long exposed to open cases of tuberculosis, 79 per cent were reactors; whereas, among those exposed for a shorter time, only 28 per cent reacted. Casual exposure had resulted in 8 per cent reactors.

TESTING IN PUBLIC AND PAROCHIAL SCHOOLS

In 1916, Dr. J. P. Sedgwick,⁵ first chief of the Department of Pediatrics at the University of Minnesota, wrote on the importance of the tuberculin test, which he was using extensively among children. He was of the opinion that by the age of 14 years, 70 per cent were reactors.

Dr. S. A. Slater,⁶ of Worthington, Minnesota, reported in 1924 on the results of a tuberculin testing survey among rural school children which startled the tuberculosis world. He found that only approximately 10 per cent of 1,654 such children reacted. However, among those from homes in which there was or recently had been a contagious case of tuberculosis, 80 per cent of the children reacted. This was exceedingly important information, for, prior to that time, many persons contended that 90 to 95 per cent of all children were infected with tubercle bacilli by the age of 15 years.

In 1926, a group of parochial grade schools was selected in Minneapolis on a geographic basis to represent the childhood population of the entire city. The plan was to test in these schools at intervals of about ten years to obtain information concerning the effectiveness of the

tuberculosis control program in this area. At the first testing, 47.3 per cent of the children from kindergarten through eighth grade reacted. The incidence of infection ranged from about 20 per cent at the age of 6 years to 70 per cent at the age of 14 years. Testing was conducted in the same schools in 1936, 1944, and 1954. By 1936, the reaction rate had been reduced to 18 per cent, with approximately 14 per cent for children of the age of 6 to 26 per cent for those 14 years old. By 1944, the rate was down to 7.7 per cent, with 2 per cent for those 6 years old and 12 per cent for those aged 14. In 1954, of 11,976 children tested in the same 24 schools, only 3.9 per cent reacted—1.7 per cent at the age of 6 years and 8.8 per cent at the age of 14.⁷

Dr. F. E. Harrington,⁸ director of hygiene in Minneapolis schools, conducted a survey of personnel of the public schools of Minneapolis beginning in 1933. This was made obligatory by the Board of Education. The tuberculin test was the first step; x-ray film inspection of the chests of reactors followed, with complete examination of those who presented shadow-casting lesions. Of the 3,602 personnel members, all but 1 woman responded. Because of examination requirements, she resigned as a cook in a high school. The suspicion thus aroused resulted in follow-up, which revealed that she had known for some time that she had contagious tuberculosis. This survey resulted in finding several teachers who required treatment and others needing lengthy periods of observation.

Since 1930, the Minnesota Tuberculosis and Health Association has conducted large numbers of tuberculin testing surveys in schools throughout the state. Much of the work has been done by Dr. Kathleen Jordan, who has administered the test 1,840,000 times.

In 1930, the Minnesota Tuberculosis and Health Association, in cooperation with Morrison County health officials, Board of Education, and the entire citizenry, conducted its first ideal tuberculosis clinic. Immediately before, high school students and personnel who volunteered had been tested. X-ray film inspections were made of the chests of the reactors. On December 12, a clinic day in Little Falls was devoted to these persons. In addition to finding some cases for further study among the high school students, one teacher had advanced contagious tuberculosis of which she previously had no knowledge. She was immediately admitted to a sanatorium. However, the disease was so advanced that she received disability compensation insurance for the next twenty-two years and was never able to return to teaching.

In Ramsey County, the local Tuberculosis Association took a significant step in 1930 by introducing the tuberculin test in the school system as a routine measure. By 1931, free tuberculin was provided to schools, and tests were offered to all seniors in the St. Paul high schools and all juniors and seniors in White Bear and North St. Paul. This program was so rewarding that, in 1935, the Division of Hygiene in the public schools took over and continued to annually test students.

In St. Louis County, the tuberculin test with x-ray film inspections of the chests of reactors was introduced in the early 1930's and has since been in continuous operation. Through the Minnesota Tuberculosis and Health Association and local physicians and organizations, this program has extended to all of the 87 counties in Minnesota.

For many years, Dr. L. S. Jordan has tested all school children biannually in the 4 counties served by the Riverside Sanatorium located in Granite Falls, Minnesota. The percentage of reactors decreased until he reported that, in 219 schools with 3,900 enrolled, no child reacted to tuberculin.

The Hennepin County Tuberculosis Association, the Glen Lake Sanatorium, and the Minneapolis Health Department instituted a three-year program in the fall of 1958 in the public and parochial schools of Minneapolis and St. Louis Park. Testing was done in 18 schools, including a junior and a senior high school. Of the 6,915 children tested, 217 (3.9 per cent) reacted. In the high schools, the percentage of reactors was 6.8 and 6.2, respectively. The test was administered to 163 personnel members, of whom 44 (27 per cent) reacted.

Only 1 person with active clinical disease was found, this person being among family contacts of pupils who reacted. In reality, 270 children and 44 personnel members—a total of 314 persons with tuberculosis—were found. It is well known that each tuberculin reactor has at least microscopic tuberculous lesions, which are potential cases of progressive clinical disease. It was the tuberculin reactors among children of a few decades ago who later provided most of the adult cases that filled sanatoriums to capacity and caused numerous deaths. If the percentages found in the 1958 study are applicable to all of the schools in Minneapolis, the future problem should be obvious. Annual testing in the same schools should provide important information concerning the annual infection-attack rate as well as other important items, such as incidence of infection.

TESTING IN COLLEGES AND UNIVERSITIES

In 1928, a tuberculin test survey was conducted on all students entering the University of Minnesota. Approximately one-third reacted. This was done by the epidermal (Pirquet) method.⁹ The next year, the intracutaneous (Mantoux) method was employed for all entering students. Slightly less than a third reacted. That year, the reactors who entered the School of Medicine had chest x-ray film inspections, and, in 1931, all students in the entire University who reacted to tuberculin on entrance had x-ray film inspections with complete examinations whenever apparently significant shadow-casting lesions were seen. This procedure became routine and has been found the most ideal method of diagnosing tuberculosis to date.

In subsequent years, the tuberculin test has been administered to approximately 160,000 students entering the University of Minnesota with the appropriate follow-up procedures.¹⁰ Soon after the test became a routine part of entrance examinations at the University of Minnesota, other colleges and universities throughout the state adopted the same procedure.

In St. Paul, tuberculin testing was done by Dr. E. R. Geer in several schools of nursing for a number of years, which resulted in fine contributions to knowledge concerning infections first acquired in adulthood. In Minneapolis, testing was done in several schools of nursing for thirty years. Nonreactors were tested every six months, and reactors had appropriate follow-up procedures.

TESTING IN INSTITUTIONS FOR THE MENTALLY ILL AND IN PRISONS

In 1934, Dr. H. A. Burns,¹¹ superintendent of the Minnesota State Sanatorium, reported the results of tests given to inmates and personnel members in the state hospitals for the mentally ill and in the penal institutions. In the 9 institutions for the mentally ill, 82 per cent of the patients reacted. Among the tuberculin reactors, tubercle bacilli were recovered from the sputum of 2.4 per cent. Of the 2,430 personnel members, 72 per cent reacted to tuberculin, and 5.2 per cent had demonstrable pulmonary tuberculosis. Dr. Burns found this information so valuable that when, in 1942, he became chief of a newly created Tuberculosis Service of the State Division of Hospitals, he conducted an annual survey in all of these institutions and, thus, brought about rapid control of tuberculosis among both inmates and personnel. This program has been maintained, with most of the tuberculous mentally

ill persons of the state now occupying the Burns Building at the Anoka State Hospital.

TUBERCULIN TESTING IN OLD PEOPLE'S HOMES

Because older residents are providing a high percentage of today's active cases of tuberculosis, persons in homes for the aged are a potential source of tuberculosis and a possible danger to personnel and to visitors. In 1954, Dr. Willard E. Peterson, of Willmar, Minnesota, conducted a testing survey in the 4 old age homes in Kandiyohi County. Of 183 residents, 65 reacted to tuberculin, and 1 had active tuberculosis. Twenty-eight of the 76 employees in these homes were tuberculin reactors. As a result of the survey, all persons admitted to these homes are required to be examined for possible tuberculosis before admission, and those who react to the tuberculin test have chest x-ray films made annually.

Dr. Kathleen Jordan, of Riverside Sanatorium, Granite Falls, Minnesota, includes the residents of a number of old people's home in her annual school testing surveys in several counties in the state. Dr. Leon Flancher, superintendent and medical director of Sunnystre Sanatorium at Crookston, Minnesota, conducts testing surveys in a number of homes in the 6-county sanatorium district. Several other physicians have also given tests to residents of old people's homes, and interest is growing in this type of program.

TESTING HOSPITAL ADMISSIONS AND PERSONNEL

In 1933, Dr. C. A. Stewart, of pediatric fame, while chief of the medical staff of Swedish Hospital in Minneapolis, of which Mr. Mills¹² was superintendent, recommended a survey of the entire personnel and all entering patients as a demonstration for one month. This consisted of examining only tuberculin reactors, of whom 4.7 per cent had progressive tuberculosis.

Two years later, Dean H. S. Diehl arranged for all admissions to the University of Minnesota Hospital to receive the tuberculin test and for the reactors to have x-ray films taken of their chests, with further examination as indicated. The first year this was in vogue, 48 persons were found who were seeking admission for non-tuberculous conditions but who had coexisting clinical pulmonary tuberculosis. He then extended this procedure to the hospital personnel. This netted 3 contagious cases: a librarian, an orderly, and a maid working in the nurses' home and dining room. In 1938, Dr. F. E. Harrington, acting superintendent of Minneapolis General Hospital, adopted the same program for that institution.

Since the principle of examining admissions and personnel in these hospitals has been adopted, this procedure has extended to the point that approximately 80 per cent of persons admitted to the hospitals of this state have an examination. Unfortunately, many of these hospitals limit the examination to x-ray film inspections of the chest. Thus, all cases of tuberculosis, except the occasional gross lesion located in the 75 per cent of the lungs visualized on films, are missed, and persons with such lesions are not appraised of their presence and potentialities. Such lesions can be detected only by the tuberculin test.

TUBERCULIN TEST AND ACCREDITATION OF COUNTIES

In 1941, the Minnesota State Medical Association, the State Tuberculosis and Health Association, the State Board of Health, and the governor of the state headed a project which consisted of accrediting counties on the basis of accomplishments in tuberculosis control. One of the qualifications for accreditation requires that at least 90 per cent of all seniors in the high schools of the county be tested with tuberculin with no more than 10 per cent reactors.

The first accreditation certificate was issued to Lincoln County on December 11, 1941. To date, 68 of the 87 counties in Minnesota have been so accredited.

TUBERCULIN TEST AND CERTIFICATION OF NURSES, FAMILIES, AND SCHOOLS

In 1932, Dr. F. E. Harrington, Minneapolis commissioner of health, officially presented health certificates to student nurses in several hospitals at their graduation exercises. The certificate indicated that the nurse had been immunized against those diseases for which there are satisfactory immunizing substances. It also showed that she had been tested with tuberculin and, if a reactor, had been completely examined, including x-ray film inspection of her chest. Thus, at the time of graduation, there was no evidence of contagious disease. In his presentation addresses, he advised these nurses to have their certificates renewed annually. By so doing, he assured them they could avoid catastrophies, such as he had seen in nurses in whom unsuspected contagious tuberculosis developed and who infected many other persons.

In 1932, Stewart¹³ wrote, "I feel certain you will agree that the present-day partially hygienic surroundings, which practically guarantee tuberculous contamination of from 25 to 75 per cent of American children, are far from ideal. How-

ever, without a single additional scientific contribution to our present knowledge of tuberculosis, this undesirable situation can be corrected, thereby providing children with hygienic surroundings, which, in the light of our understanding of the disease, they have a right to expect. Let us hope, therefore, that future endeavor will provide certified homes, schools, churches, public institutions, communities, cities, and states, which collectively will give us a certified nation."

Stewart said, "In certain parts of the United States, certified areas exist in which no cow is in danger of contracting tuberculosis from other members of the herd, and, in these certified districts, to be a calf is safer than to be a human baby insofar as tuberculous infection is concerned.

"When certification of America is accomplished and diligently maintained, tuberculosis undoubtedly will vanish from our midst much as typhoid fever has vanished, and thereafter we shall cease to live under the continual menace of the tubercle bacillus. This emancipation from the scourge of tuberculosis from which we needlessly suffer will then provide children with the hygienic surroundings which, with respect to this disease, they now have a right to expect."

In 1937, Dr. Stewart¹⁴ reported a family accreditation project which was begun by testing all members of the household with tuberculin and was then carried through as indicated. He routinely administered the test to his private patients and to those in the clinics he conducted. Of those who reacted, he sought the source of the infection among parents, grandparents, and other adult associates. He said the economic method for canvassing homes also exerts a valuable educational influence on the laity. Its liberal use is recommended for the purpose of detecting human sources of contagion in social groups that otherwise would not be investigated.

When the Committee on Tuberculosis of the American School Health Association decided to recommend certification of schools with reference to tuberculosis activities in progress, Minnesota was chosen as the demonstration state because it had maintained a continuous tuberculin testing program in schools for so many years. The qualifications for awarding a certificate to a school consisted of testing at least 95 per cent of the children and 100 per cent of the personnel with appropriate examinations of all personnel and high school student reactors.^{15,16} To keep the certification status in force, these procedures must be repeated every two years.

Certification of schools has proved to be the most effective method ever devised for insuring

a good response to a testing program. Moreover, it stimulates interest in tuberculosis eradication activities not only in schools but in entire communities. To date, more than 3,100 certificates have been issued to schools in Minnesota.^{17,18} Dr. L. S. Jordan has kept all schools in his 4-county Riverside Sanatorium district certified for many years.¹⁹ In 1958, the Program Committee of the Minnesota Tuberculosis and Health Association voted unanimously to recommend that state-wide certification of schools be given high-priority in the organization's program.

The Committee on Tuberculosis of the American School Health Association has adopted certification of schools as its main project and has strongly recommended it for all schools in America. It has already been adopted by several other states, including Illinois, Iowa, Montana, New Mexico, North Dakota, and South Dakota, where the schools display thousands of certificates.

COMMUNITY, MUNICIPAL, AND COUNTY TUBERCULIN TESTING SURVEYS

Apparently, the first tuberculin testing survey with adequate follow-up done by physicians in private practice was conducted by Drs. Edwin J. Simons and Herman E. Hilleboe²⁰ in the village of Swanville, Minnesota, and surrounding countryside in Morrison County in 1930. Nineteen cases of clinical tuberculosis were discovered in nine months. A suspected association existed between some of the patients and tuberculous cattle. Therefore, the veterinary profession promptly retested all of the cattle in the area. Eighteen reactors were supplying cream to a local creamery. Among the school children, 19.7 per cent reacted to tuberculin. This was an example of what can be done by practicing physicians in a rural community. The report was unparalleled.

In 1939, Davies and Scherer surveyed a township with a population of 367 in St. Louis County. Among the 301 persons who responded, 6 had active tuberculosis. Two years later, Davies and Robb reported a survey of 3 townships with a total population of 1,275 of whom 1,099 responded. Among the tuberculin reactors, 55 showed evidence of the reinfection type of pulmonary tuberculosis, and 1 had active disease.

As the tuberculosis situation markedly changed with reference to mortality, morbidity, and infection attack rates and since the tuberculin test is the only procedure by which all persons harboring tubercle bacilli can be found, the idea was conceived of offering the test to the entire citizenry of a community, municipality, or county.

In 1941, the Meeker County Medical Society offered the tuberculin test to every citizen in the county with x-ray film inspection of the chest of each reactor. Although this survey was discontinued because of World War II, when only two-thirds of the citizens had been tested, 22.8 per cent of those tested had reacted to tuberculin, and 16 previously unknown cases of clinical tuberculosis were found.²¹ This demonstration was conducted as a public service by local physicians and the hospital. All work was done gratis, including x-ray films. No material or equipment was imported. Thus, it was demonstrated that the physicians of this county are capable of doing all phases of tuberculosis work.

During the 1950's, 4 other counties—Lincoln, Lyon, Kittson, and Cottonwood—have had county-wide tuberculin testing for all age groups.

In late 1951, the Lincoln County Medical Society, the county superintendent of schools, and dozens of enthusiastic volunteer workers joined to make the survey a success. Representatives of the Minnesota Tuberculosis and Health Association organized the county and prepared publicity. About 71 per cent of the available population responded, of whom 20 per cent reacted (30 per cent of the adults and 2.43 per cent of school children).

Although a number of persons presented abnormalities casting x-ray shadows, no case of progressive clinical tuberculosis was found. The citizens of this county have been so well guarded for more than twenty years that only 1 case of clinical tuberculosis was reported and no one was known to have died during the five-year period, 1952 to 1957.

In Lyon County, 79 per cent of the population participated in the survey conducted in late 1952 and early 1953.²² In 1954, Kittson County reported that 82 per cent of its available population had been tested,²³ and, in 1957, Cottonwood County had a 75 per cent response.¹⁷ In all 3 counties, the reaction rate was around 20 per cent. Among the children, it was about 4 per cent. Only 4 or 5 clinical cases of tuberculosis were found as direct results of these surveys, but several thousand persons were found with potentially active cases of tuberculosis. When their tests were read and when they received their chest x-ray film examinations, these individuals were impressed with the fact that they should be examined regularly throughout their lives.

At least 7 community-wide testing programs were conducted during the 1950's. In all of these areas, the surveys were requested by the residents, either because recent tuberculosis cases had developed or because testing in their schools

resulted in finding a high percentage of reactors among the children.

For example, at Campbell, a village with a population of 391, adults and preschool children were tested in 1953 after school testing revealed that 12 per cent of the school children reacted to tuberculin. In Hastings, with a population of about 6,000, approximately 90 per cent of the available population responded in March 1956 in a testing survey which was requested after several clinical cases of tuberculosis had been reported in that city.^{24,25} Other villages and cities which have conducted tuberculin testing surveys for persons of all ages are: Hayfield, where 841 had tests;^{26,27} White Bear, where 4,724 persons reported for tests; Isle-Wahkon, which had a 1,425 response; and Wyanett Township in Isanti County, where about 450 participated. Redwood County in South Central Minnesota had a 4-township survey in June and July 1958, with 1,381 participants.

In these county and community surveys, for the most part, local physicians did the tuberculin testing as a public service, and x-ray films of tuberculin reactors in most instances were made at cost. The county tuberculosis and health associations paid the costs.

TUBERCULIN TESTING IN INDUSTRIES

The Washington County Tuberculosis and Health Association has helped to finance tuberculin testing in a number of industrial plants in that county. In 1956, close to 900 employees of the Andersen Corporation at Bayport had tuberculin tests and chest x-ray films. A total of 307 reacted to the test. The plant management and employees were all most cooperative and interested in continuing x-ray follow-up for those infected with tuberculosis germs.

Five smaller industries in the county were surveyed in December 1957. Of 252 men employees, ages 18 to over 70, 96 reacted. Of 160 women, 37 reacted.

Tuberculin testing surveys in industries can be a valuable case-finding program, particularly because of the many men employees 40 years of age and over—the group which is today providing the largest percentage of new clinical disease.

TUBERCULIN TESTING AMONG MEXICANS, AMERICAN INDIANS, AND NEGROES

In 1933, Dr. James E. Perkins, then epidemiologist of the Minnesota State Department of Health, did a survey on the 31 Mexican households with 184 members who were wintering in the Red River Valley. Of the 168 who received

the test, 52 per cent reacted, 4.2 per cent of whom had shadow-casting lesions.

In St. Paul, 350 families in the Mexican quarter were given the tuberculin test in 1940, resulting in a high percentage of reactors. Dr. L. H. Flancher and associates conducted a survey among Mexicans in the southern part of Minnesota in 1943. Of the 261 tested, 37.9 per cent reacted. Of those under the age of 14 years, 19.8 per cent reacted; of those 14 to 20, 40 per cent showed a reaction; and of those over 21, 53 per cent reacted. Three persons had active tuberculosis at the time.

In 1930, among Minnesota Chippewa Indian children from birth to 4 years, 37.8 per cent reacted, while in the age group of 45 to 49, 85.4 per cent reacted.

In 1931, Ringle and associates²⁸ reported that 15.3 per cent of 2,096 white children reacted. In the same county, of 433 Chippewa Indian children, 40 per cent of preschool and 65.6 per cent of school age children reacted.

Initiation and perpetuation of good diagnostic and therapeutic measures resulted in a continuous decrease in the incidence of tuberculin reactors among Indian children until it is now approximately the same as that among Caucasian children of the same area. In Minnesota, tuberculosis mortality among Indians was 529.2 per 100,000 in 1937, but it was 0.0 in 1955.

In 1938, we tested about 500 children and adult Negroes at the Phyllis Wheatley House in Minneapolis, and approximately 50 per cent reacted. The same year in St. Paul, 316 were tested, and 60 per cent reacted. Physicians working especially among these groups indicate that the mortality, morbidity, and infection attack rates have decreased to approximately the same degree as among Caucasians of the same areas.

TUBERCULIN TESTING BY PHYSICIANS IN PRIVATE PRACTICE

Such a large number of practicing physicians in Minnesota have adopted the tuberculin test as a routine part of every examination that, in all probability, they have employed this procedure more times than have been reported in surveys, clinics, and so forth. Physicians in general practice especially have played a significant role. For example, Charles E. Sheppard, of Hutchinson, has reported giving 3,584 tests in his office. There are 4,281 physicians in this state, with a preponderance in general practice. There are approximately 3½ million people in Minnesota, of whom about 75 per cent are uninfected and, therefore, should be tested periodically with tuberculin. This testing must be done by physi-

cians and nurses. The remaining 25 per cent do not need retesting but should have periodic examinations, including x-ray film inspections of the chest.

LONGITUDINAL STUDIES OF TUBERCULIN REACTORS

In 1921, Dr. F. E. Harrington²⁹ established the Lymanhurst School for Tuberculous Children in Minneapolis with two main objectives, one of which was to conduct research on tuberculosis among children from birth through high school age in order to establish facts concerning this disease in children. The tuberculin test was an important part of each examination. Approximately 1,000 children ranging in age from pre-school through high school were examined in the clinic annually. This clinic was continued for over twenty years, during which time more than 19,000 children received the tuberculin test. An effort was made to have children return to the clinic for periodic examination, including x-ray films of the chest and other phases of examination for those who reacted to tuberculin and repeated tuberculin tests for those who did not react initially. Longitudinal studies were begun on students of nursing and medicine in the 1920's. Many thousands of students are still participating in these studies.

These longitudinal studies among children and young adults almost revolutionized thinking concerning various aspects of tuberculosis. Speculations, theories, personal opinions, and predictions were replaced with important facts. For example, there had been a dictum to the effect that apparently healthy children or adults who reacted to tuberculin walked within a charmed circle of freedom from the development of incapacitating tuberculosis. Actual prolonged observation of tuberculin reactors during the 1920's and early 1930's, however, revealed that the dictum must be replaced with one to the effect that persons who react to tuberculin walk within the circle in which all illness and death occur from tuberculosis.

It was also observed that roentgenograms of the chests of children and young adults who do not react to tuberculin never reveal evidence of lesions which prove to be chronic pulmonary tuberculosis except in the occasional rapidly progressive or terminal case. It was also discovered that even among tuberculin reactors, chronic pulmonary lesions rarely occur before adolescence. Therefore, it was a sound procedure to discontinue making x-ray films of the chests of children who did not react to tuberculin or not to make more than one base-line film of reactors

until adolescence was attained. This was also a good economic discovery.

Long-term observations of children and young adults who had demonstrable primary pulmonary infiltrates, which might be considered very serious from the x-ray shadow alone, revealed that they were exceedingly benign. Usually, without causing significant symptoms, they resolved over a period of a year or more, completely disappearing in some cases and in others leaving evidence of calcific deposits at their former sites and/or in regional lymph nodes.

Comparative studies of those sent to sanatoriums, those who attended a special school, and those who remained at home revealed that no matter how much or how little was done by way of treatment, primary pulmonary infiltrates resolved in the same manner.

There was a widespread belief that much of the destructive clinical tuberculosis in teen-age girls and boys was due to infections postponed to adult life. Actual observation, however, revealed that the destructive disease among persons in the teens evolved among the previous tuberculin reactors and, therefore, the disease was the clinical reinfection type rather than primary.

Therefore, it became obvious that great care must be exercised in differentiating between primary tuberculous pulmonary infiltrates and pulmonary lesions of the reinfection type in order to avoid erroneous deductions concerning the value of treatment procedures and materials designed to prevent tuberculosis. The best method of making such differentiation was by finding the lesions in recent tuberculin converters.

Observations clearly demonstrated that reinfections with tubercle bacilli in childhood or adulthood are not tolerated as well by the human body as first infections.

Stewart¹³ observed that "primary tuberculosis not only fails to prevent but actually predisposes one to the development of phthisis if successful reinfection occurs. The human body can reduce a primary tuberculous lesion to what is known as the primary complex once and only once."

When it was definitely established that clinical disease develops only in persons who react to tuberculin, an extensive and intensive educational campaign was launched to bring this fact to the attention of professional workers and the public everywhere, so that all tuberculin reactors might be found and warned of present or subsequent clinical potentialities. At first, this campaign was not well received because of the general belief that tuberculin reactors are immunized against clinical tuberculosis. However,

as others observed disasters occurring among reactors, the truth was more generally accepted and taught.

Periodic examinations of the chests of adult tuberculin reactors have shown that evidence of developing clinical disease can be found by x-ray shadow on an average of two and one-half years before symptoms appear and the disease becomes contagious. Equally important, the disease can be discovered when it can be easily treated successfully. The tuberculin test alone can never solve the tuberculosis problem, since it only serves to detect those who have living tubercle bacilli in their bodies. A reaction gives two leads to follow: one to the source of the individual's infection and the other to the infected individual, who must be watched for possible subsequent clinical tuberculosis.

TUBERCULIN: ITS DISTRIBUTION, ADMINISTRATION, AND INTERPRETATION

Throughout the years, Koch's original tuberculin has been the standard testing material in Minnesota because it has proved so effective among both people and animals. Its continued use was strongly recommended by the Committee on Tuberculosis of the State Medical Association and the Program Committee of the Minnesota Tuberculosis and Health Association in 1958.

In the 1890's and the early 1900's, tuberculin was administered by the subcutaneous method. Soon after 1907, the epidermal method devised by Pirquet, of Vienna, was extensively used. A little later, the intracutaneous method of administration described by Mantoux came into general use. Other methods, including the percutaneous (patch test), have been employed in a limited way.

Stewart and Dyson³⁰ introduced original tuberculin intracutaneously into the skin of one arm and a corresponding dose of purified protein derivative into the other arm of 220 infected persons. The areas of reaction were carefully measured by a modification of Hammar's area by weight method. The two testing substances were equally efficacious. As a rule, children reacted more extensively than adults. The authors were of the opinion that the smaller reactions in older persons were due to a general tendency for sensitivity to tuberculin to diminish slowly as the postinfection time elapses.

Stewart³¹ compared the administration of tuberculin by Pirquet's scarification method and a single sewing-needle puncture through a drop of tuberculin method. The reaction agreement was 100 per cent. The puncture method has since been extensively used by Heaf, of Wales,

who has devised a special instrument to facilitate administration.

The percutaneous, scarification, puncture, and intradermal methods of administration are all good for persons highly sensitized to tuberculo-protein. For such individuals, it is only necessary to introduce tuberculin into the cleansed pores of the skin through an abrasion or a needle puncture in the skin. However, as allergy is evolving and before it has reached its plateau and, also, after it has waned to low levels, it may not be elicited by these methods of administration, whereupon large doses of tuberculin by the intracutaneous method may then be necessary.

With the intradermal method (Mantoux), a physician or nurse can administer 300 tests per hour with ease when individuals are lined up and preliminary work has been done. With a population of approximately 3½ million people and 4,200 physicians in Minnesota, each physician would need to do less than 1,000 tests per year—a half day's work. A large volume of testing can be and should be done by nurses. Therefore, it is obvious that no one would be burdened in an all-out tuberculin testing program which included every citizen.

Since 1932, the Ramsey County Tuberculosis and Health Association, in cooperation with the St. Paul Bureau of Health, has made tuberculin in proper dilution available without cost to all physicians in that city.

In 1933, the Hennepin County Tuberculosis Association, in cooperation with the County Medical Society and the Minneapolis Department of Health, arranged to deliver freshly diluted tuberculin ready for administration to the offices of all physicians every ten days or two weeks. Physicians were even provided with syringes and needles with instructions for use. Frequently, pertinent information printed for the physician was included with tuberculin deliveries. This fine service has proved of great value, since it placed in the hands of all physicians the finest diagnostic agent in tuberculosis.

In 1932, the Minnesota Tuberculosis and Health Association arranged to provide properly diluted tuberculin gratis to physicians throughout the state on request. In 1937, the State Board of Health assumed this responsibility, which has since been routine. Dr. D. S. Fleming, director, Division of Disease Prevention and Control, Minnesota State Department of Health, kindly provided the accompanying table showing the amount of tuberculin in various dilutions ready to administer which has been delivered to Minnesota physicians since 1947.

Year	OLD TUBERCULIN DILUTIONS		
	1:100 No. cc.	1:1,000 No. cc.	1:10,000 No. cc.
1947	2,735	45,203	17,807
1948	2,462	47,466	18,893
1949	3,252	49,995	20,433
1950	3,860	54,497	20,957
1951	4,041	60,957	22,565
1952	4,703	57,911	23,055
1953	3,405	51,281	13,825
1954	1,330	46,124	17,986
1955	2,660	50,175	5,820
1956	2,288	53,035	2,285
1957	1,754	48,385	1,505
1958	1,900	55,445	1,591
	34,390	620,474	166,722

Many years ago, the National Tuberculosis Association published in *Diagnostic Standards* a method of reading tuberculin tests according to degree of reaction as follows: "A reaction showing some definite induration more than 5 mm. and not exceeding 10 mm. in diameter is recorded as a one plus (+) reaction. A two plus (++) reaction is an area of induration measuring from 10 to 20 mm. in diameter. A three plus (+++) reaction is characterized by marked redness and induration exceeding 20 mm. in diameter. A four plus (+++++) reaction consists of severe induration and an area of necrosis. A reaction with a trace of induration measuring 5 mm. or less in diameter is rated as doubtful. Redness without associated induration does not constitute a reaction." Numerous variations have been suggested from time to time, but this method of reading is entirely satisfactory. In fact, many physicians prefer to read tests as negative or positive without reference to degree of sensitivity.

Beginning in 1932, tuberculin tests were measured and were reported according to diameter of induration or edema in millimeters from which they could be translated into 1, 2, and 3 plus reactions. This was done in the Minneapolis Health Department where it was carefully observed by the Lymanhurst staff for several years. Later, measuring was used only by beginners. It was found too cumbersome, impractical, and time consuming to the experienced reader, since the diameter of the visible or palpable induration or edema was estimated with sufficient accuracy. A method that will not be carried out by practicing physicians should always be replaced by one that they consider practical.

In 1930, Dr. W. L. Rathbun, of Cassadaga, New York, assigned the administration and reading of tuberculin tests to nurses in the Chautauqua County sanatorium district. The next year, this procedure was introduced in the Min-

neapolis Health Department by Dr. F. E. Harrington, commissioner of health. It was found that nurses administer and read tuberculin tests with great care and accuracy. Since that time, nurses have administered a great many tests not only in clinics and surveys but also in the offices of physicians in Minnesota.

In order to obtain information concerning the relative toxicity of tuberculin for different persons, Stewart³² conducted a study in 1933 of the surface area of the cutaneous reaction on children between 8 and 14 years of age, all of whom were reactors to the tuberculin test and in whom calcified intrathoracic lesions were demonstrable. No case was included with evidence of the acute inflammatory parenchymal stage of primary tuberculosis or the reinfection type of the disease. He used a modification of the area by weight method suitable for determining the area of the tuberculin reaction. The measurements of the area of reaction were recorded three, twenty-four, forty-eight, seventy-two, ninety-six, and one hundred sixty-eight hours after administration of 0.1 mg. of tuberculin. He found that the relative rapidity with which the time required for the area of a positive Mantoux reaction to reach its maximum size is directly related to the degree to which the individual is hypersensitive to tuberculin.

After fourteen years of careful study of tuberculosis among children, Stewart³³ stated that the degree of skin sensitiveness to tuberculin in primary tuberculosis is not significant.

When Bang made careful postmortem studies of animal tuberculin reactors in 1892 and thereafter, he was unable to establish a relationship between the degree of the tuberculin reaction to the amount of or progress of disease present.

In the nearly 400,000,000 tuberculin tests administered to the cattle of this country and postmortem examinations of more than 4,000,000 reactors, the degree of the tuberculin reaction has not provided information as to extent of disease. In many instances of high degree reactions in animals, few or no lesions have been found. On the other hand, some animals with extensive lesions have shown small tuberculin reactions.

In our longitudinal studies, we have seen no evidence to indicate that children or adults who react strongly to tuberculin have more clinical disease at the time or that clinical disease is more likely to develop in them in the future than those who present reactions of lower degree.

Periodic administration of the tuberculin test does not result in sensitive tissues in uninfected persons.

The changed situation was made possible by those who worked so hard, especially in the last two decades of the nineteenth century and the first few decades of the present century, to decrease the number of tubercle bacilli. Veterinarians and their allies first destroyed great armies of the bovine type of bacilli through pasteurization of milk and, later, by removing animals harboring tubercle bacilli until they have disappeared in some places and are few in others.

By isolating patients with tuberculosis in sanatoriums, armies of tubercle bacilli were corralled, and populations of the human type of organism were thus markedly reduced.

Inasmuch as the tuberculin test is the master key and eradication can be accomplished only through its use, some of its most important values must be kept in mind.

1. A tuberculin reaction can be elicited within three to seven weeks after tubercle bacilli invade the human body. This is before any other phase of an examination is of avail. The reaction indicates presence of at least microscopic lesions containing living tubercle bacilli. These lesions are usually multiple and located in different parts of the body, with a preponderance in the lungs.

2. The tuberculin test is the best epidemiologic procedure. The reaction immediately places the physician on the trail of a contagious case of tuberculosis. By seeking the sources of infection of children who react to tuberculin, more clinical and contagious cases of tuberculosis among adults can be found than by any other method. It is equally valuable in tracing sources of infections among adults who have recently converted from nonreactors to reactors. It was the epidemiologic use of the tuberculin test that aided most in controlling tuberculosis among students of nursing and medicine at the University of Minnesota and other schools of nursing. The tuberculin reaction throughout the state of Minnesota has led to the discovery of previously unsuspected but contagious cases of tuberculosis in parents, grandparents, and other adult associates of children, such as maids, farm hands, and school personnel.

3. The tuberculin reaction indicates the magnitude of the tuberculosis problem in a family, community, or larger group of people rather than the mortality or the morbidity rate. The reactors to tuberculin provide the crop of clinical cases which must be harvested.

4. The tuberculin reaction detects persons who should be examined for clinical tuberculosis promptly and periodically thereafter. If clinical

disease is not already present on first examination but evolves later, sufficiently frequent periodic examinations are capable of locating it on an average of more than two years before it causes symptoms or becomes contagious. Found in this early stage of evolution, prompt treatment is nearly always successful with a minimum amount of time lost from work.

5. The tuberculin reaction often places responsibility in cases which come to litigation. The place where exposure to contagious cases is allowed to occur and, therefore, where the individual first manifests a tuberculin reaction is responsible for clinical disease that may appear months or years later rather than the place where he happens to be working at the time the clinical lesion develops to demonstrable proportions.

6. The tuberculin reaction determines the effectiveness of a tuberculosis eradication project by the percentage of children reacting to the test at intervals after the program is placed in operation. Throughout the state of Minnesota, this has been the best criterion for almost forty years.

7. The tuberculin reaction may become the criterion for beginning treatment. During the past, treatment has usually been initiated after symptoms and contagion were present or the disease was so gross that it cast visible x-ray shadows. Probably the best treatment in the future will be started as soon as possible after infection occurs. This can be determined early only by periodic tuberculin testing. Since tuberculous lesions lose their blood supply, their existence must be known before this occurs so that germicidal drugs may be carried to the tubercle bacilli by the blood stream. No matter how germicidal a drug may be or in what concentration it is placed in the blood, its administration will be futile if the blood supply is lacking. No one knows the time required for tuberculous lesions to lose their blood supply. Therefore, if an adequate drug is found, it should be given as soon as possible after the tuberculin reaction reveals that tubercle bacilli have invaded the body.

8. The tuberculin reaction has an exceedingly important educational value. For example, when mothers watch a long line of several hundred or a thousand school children having tuberculin tests read and see only the occasional reactor, it is obvious to them that the reactor has something that the others do not have. It is this something concerning which they immediately seek information.

TUBERCULIN REACTOR REGISTRY

Why we have waited until gross and often contagious disease is present before reporting it to

health authorities is an enigma. We have known for more than thirty years that all tuberculin reactors should be reported to the health department. In fact, longitudinal studies under the direction of Dr. F. E. Harrington, commissioner of health for Minneapolis, were so revealing that, in 1930, he requested all physicians to report to the health officer those persons who had no evidence of tuberculosis except the tuberculin reaction as well as those who had demonstrable clinical disease. He wanted a list of all tuberculin reactors so his epidemiologists could seek the sources of their infections and so all who had attained adulthood could be examined periodically. In 1933, the Minnesota Trudeau Society rejected a motion recommending that tuberculin reactors be reported to the State Board of Health. However, the same organization in 1941 voted favorably on the following:

1. That all reinfection and extrapulmonary tuberculosis be reported to the State Board of Health.
2. That anyone with primary infection as demonstrated by tuberculin reaction, with or without clinical or laboratory findings, should be reported as such in order to allow for proper epidemiological work, including examination of all intimate contacts, but not to be counted as cases of tuberculosis.
3. That both groups be reported on the same form.

The first tuberculin reactor registry was established in 1954 by Paul Williamson, executive director of the Iowa Tuberculosis Association. This was the beginning of what should become a nation-wide movement. In fact, registries already are being started in other places. In this respect, Minnesota has lagged. If we hope to eradicate tubercle bacilli, every person harboring them must be found, registered, and examined periodically. It is they and those whom they may infect who will provide the illness and death from tuberculosis in the future.

PRESENT MISUNDERSTANDINGS

In 1916, in an article on early tuberculosis in children, Sedgwick⁵ said that the tuberculin test was especially valuable in children in the first year and of great value in the first few years. He said that after that, the value becomes less and less because a reaction would appear in a large percentage of adults who were tested. This was the general belief at that time, which became so firmly embedded in the minds of health workers that it formed a high hurdle to those who desired to extend the tuberculin test to adults of all ages and determine the facts. Even today, it is not unusual to hear, "Why administer the tuberculin test to adults since they are all infected?" Actual testing, however, has revealed that by no means do all adults of today react

to tuberculin. In a county-wide testing survey, Jordan and Jordan³⁴ found that among women between 60 and 69 years, 50.8 per cent reacted, and among men of the same age, 59.3 per cent reacted; whereas, among seniors in high school, 4 per cent and among younger children, 1.3 per cent reacted.

Thus, workers must be alerted to the fact that the tuberculosis situation has changed, resulting in far fewer infections among persons in all ages of life.

For so long, tuberculosis workers in case-finding programs sought advanced and usually contagious cases of tuberculosis. Lesions below that level did not seem important to them. If one has not recognized the changed situation, there is danger of overlooking or failing to understand the only case-finding procedure by which tuberculosis can be eradicated. In fact, it appears that not even enough professional workers have recognized the changed situation to prevent considerable retardation of the eradication program. For example, opposition is now sometimes voiced to tuberculin testing in schools and among older groups because so few react and the number of advanced cases among children and even personnel is almost nil. Such a procedure is often said to be a waste of time and effort.

The object of tuberculin testing in schools and among older groups is to find all who are harboring tubercle bacilli, seek their sources of infection, and, in due time, place them on the list for periodic examination. While in many grade schools not more than 2 or 3 per cent of children react, testing of personnel members reveals 15 per cent or more.

Each tuberculin reactor with clear x-ray films has tuberculosis as surely as the individual dying from consumption. The only difference is the evolution of the disease. At one time, the consumptive person could have been found with no evidence of tuberculosis except the tuberculin reaction. Therefore, all persons who react to tuberculin must be examined periodically, so that those in whom clinical disease is destined to evolve will have it found before it becomes contagious. Thus, the main objective of tuberculin testing surveys among persons of all ages is to find the persons harboring tubercle bacilli and keep their organisms corralled. Eradication will not be achieved as long as anyone reacts to tuberculin.

SUMMARY

The tuberculin test has been employed in diagnosis among both people and animals in Minnesota for the past sixty-five years. Among cat-

tle alone, it has been administered more than 28,000,000 times, and people have received several million tests. Tuberculin has stood the test of time better than any other diagnostic agent.

There have been 258,606 cattle slaughtered and given postmortem examinations in addition to large numbers of other animals, including fowls and swine. Many postmortem examinations have been made of human tuberculin reactors who died from tuberculosis or other conditions. Postmortem findings in both animals and people have left no doubt as to the meaning of the tuberculin reaction.

There are few places, if any, where more tuberculin testing has been done among people percentagewise than in Minnesota and none where its effectiveness in the tuberculosis eradication campaign has been more thoroughly proved. However, the paradox continues—namely, why all citizens are not tested at least as frequently as cattle.

Miss Mary Goddard, R.N., who initiated the Kittson County tuberculin testing project, produced a spot map showing the location of each reactor. Thus, the locations of the county's remaining tubercle bacilli were brought into bold relief. They may be likened to machine gun nests and land or sea mines, which an army or a navy encounters in cleaning up operations following a war.

It is the eradication of the three pathogenic types of tubercle bacilli which demand immediate attention and effort if we desire to free our citizens from tuberculosis. Every community must not only produce a spot map but also keep it up-to-date with reference to locations of people harboring tubercle bacilli. This can be done only by periodic community, county, and statewide tuberculin testing.

With the changed situation and the ultimate goal now in sight, our viewpoint must change with reference to requirements of work and funds. Present staffs of tuberculosis organizations, health departments, nursing and medical groups, and so forth, will need to be multiplied many times. The present \$700,000 received from the annual sale of Christmas Seals is a mere pittance. Our sights must be raised, aiming at millions of dollars to be expended annually for awhile.

Adequate funds will be forthcoming when the public is informed of the tremendous magnitude of the problem, and people everywhere see money being spent in their own communities to round up and corral all tubercle bacilli. There is little doubt that the annual income from the tuberculosis Christmas Seal sale could be multi-

plied at least by 5 if an intensive educational campaign were launched and workers were actually seen finding the tubercle bacilli in every community. Even with such increased activity, we must gird for a long war. No person living and working today will be alive when the eradication of tubercle bacilli is announced.

In the history of mankind, there has not been such an opportune time to drive swiftly toward the eradication goal. Tuberculosis is only wounded. Like the wounded animal, it is in the most dangerous stage. Many persons have been killed by taking chances with wounded animals. Therefore, our citizenry is in great danger as long as tuberculosis is only in the wounded stage.

It is true that the work of the past has resulted in outstanding accomplishments. In 1911, the Minnesota tuberculosis mortality rate was 119.7 (2,522 deaths), but in 1957, it was 3.1 per 100,000 (104 deaths). Morbidity has also decreased. However, the stark fact remains that tubercle bacilli still reside in approximately three-quarters of a million places in Minnesota.

More than \$60,000,000 was spent building and maintaining sanatoriums in Minnesota in an effort to repair the damage done by tubercle bacilli and to prevent contagious cases from spreading the germs. Several million dollars are still spent annually for these purposes.

The new case rate will continue to decline slowly, as it will depend upon the decrease in tuberculin reactors. The rate of infection will continue to decrease in 2 ways: (1) by preventing those already infected, mostly elderly people, from becoming contagious and establishing new infections in others and (2) by completion of the life span of the older generation now harboring tubercle bacilli.

The hope of eradicating tubercle bacilli will be in vain as long as we continue to do from year to year only what we did each previous year. With all information and armamentarium available to eradicate tuberculosis, it is the responsibility of professional workers and their allies to organize an all-out campaign for the destruction of the last tubercle bacillus. If this is not done, future generations will have a just cause for criticism.

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BRONCHIAL OBSTRUCTION is frequently caused by inspissated mucus. Patients with asthma, hay fever, or chronic bronchitis are especially susceptible. Unilobar obstruction is more common than multilobar, and segmental bronchi of the upper lobes are most often affected. Impactions are shiny, gray-green casts from 1 to several centimeters long.

Persistent obstruction results in suppuration distal to the blocked bronchus, with consequent destruction of the bronchial wall and development of atelectasis, pneumonitis, abscess, or bronchiectasis. Cough, producing mucous casts and purulent sputum, is the most common symptom. Fever, pleuritic pain, and hemoptysis also occur. Recurrent respiratory infections associated with hemoptysis in an asthmatic patient should suggest mucoid bronchial impaction.

Roentgenograms of the chest most frequently reveal segmental obstruction; sometimes obstructive pneumonitis, abscess, or a solitary nodule. Bronchoscopy may permit direct inspection and removal of the mucous plug.

SOL KATZ, M.D., George Washington University, Washington, D. C. *GP* 17:125, 1958.



Arthur T. Laird, M.D.

By EDWARD L. TUOHY, M.D.

Santa Barbara, California

ARTHUR T. LAIRD is a conspicuous leader in the field of public health. It is fitting indeed that a biographical sketch of him should be published by THE JOURNAL-LANCET.

A purposeful biography should aim to outline how the individual differs from the average of his time and period without becoming eccentric. Dr. Laird is one of the most wholesome comrades anyone could hope for. At 86, in retirement in Duluth, he has retained his perceptive powers unusually well and moves about with the light step of the inquiring accumulator of wisdom. The result is that he is weighed down with much wisdom and few cares. The accompanying photograph, while good enough for passport purposes and showing the sparkle in his eyes and his restrained smile, does not begin to portray the man. It does not even show the full restraint his hirsute head-covering has assumed.

I shall attempt to outline, with the aid of modest notes he has sent me, enough of Dr. Laird's life story and what he has meant to his friends in Minnesota to let the reader know this truly great man. As this analysis starts, we approach the enigma of the influences in our lives of heredity and of environment. We are dealing with an eminently successful life that has given comfort to all of his associates and neighbors. Just what befell him to make his life tick so well?

To explore the development of this man's life, I shall weigh heavily on such matters as his parents and their background; the sort of young people with whom he grew up and studied; the individuals who gradually led him into the medical profession where he has served so outstandingly; the high school and preparatory studies that fortunately led him to matriculate at Oberlin College in Ohio; but, more than all else, the religious atmosphere in which he grew

up. Since most of Dr. Laird's life work centered on the field of tuberculosis and its control, the reader is directed to reread the scholarly history of that movement in Minnesota by the world-famed leader, Dr. J. A. Myers.¹ This will make it possible for me to dwell specifically upon Dr. Laird as a man, his career, and the result attained by a dedicated life.

James Hayes Laird, Dr. Arthur T. Laird's father, was born in Milton, Pennsylvania, August 19, 1832, of Scotch-Irish ancestry. Dr. Laird's mother, Martha M. Turner, was a New Englander transplanted to Ohio. Dr. Laird himself was born in Lake County, Ohio, on July 23, 1873.

While "Hayes" Laird was still a small boy, the Laird family moved from Pennsylvania across the Alleghenies in a wagon and on foot to the vicinity of Columbus, Ohio, where they built and lived in a log cabin. Hayes and his brothers and sisters received much of their schooling from their mother who had been a teacher in Philadelphia. Hayes learned the carpentry trade and, at the same time, developed an ambition, which his mother encouraged, to work his way through college. He was a teacher in the county schools when he heard that one could readily earn his expenses at Oberlin College in Lorain County, Ohio, near Lake Erie.

Arthur Laird's mother was one of the Turner daughters. Her father, Porter Turner, was a skilled house builder descended from the "Men of Kent" who came to Scituate, Massachusetts, possibly in a second trip of the Mayflower, and settled to ply their trade in Lyme, New Hampshire, and across the Connecticut River in Thetford, Vermont. The founders of Oberlin College persuaded Deacon Porter Turner to bring his family to Ohio via the Erie Canal. Deacon Turner was kept busy supervising the construction of temporary and permanent build-

ings for the college. He supervised construction of the first church, which still stands. Dr. Laird's mother, Martha M. Turner, was one of his younger daughters, born at Oberlin.

At Oberlin, Arthur's father was known as James rather than James Hayes Laird. He graduated from the college in 1860. As a student, he volunteered for duty in the United States Army and served as orderly sergeant in Fort Stevens during Early's raid on Washington, D. C. Martha Turner graduated from the "literary" department of Oberlin in 1861. James Laird graduated from the theological department in 1863. They were married on September 5, 1864.

After serving as pastor in parishes in Fairfield, Ohio; Desplaines and Park Ridge, Illinois; and Madison, Ohio, the Rev. James H. Laird was called back to Oberlin as principal of the Preparatory School in 1874, the year after Arthur Laird was born. In 1876, the Rev. Laird received a call to Andover, Massachusetts, where he remained for seven years. Because of his wife's failing health, he then accepted a pastorate in Hinsdale, Massachusetts, in the Berkshire Hills, 9 miles east of Pittsfield and preached there for twenty-nine years. Dr. Laird's mother died in 1888.

That same year, Arthur Laird entered prep school at Oberlin. When he arrived at Oberlin, Dr. Fred E. Leonard gave him his physical examination. Perhaps prompted by the nonathletic physique, this physician suggested, "Attend as many of Millikan's lessons as you can." Millikan was earning his way through Oberlin College by teaching Latin and the natural sciences and assisting in the gymnasium. "We followed him in shorts near dusk as we raced in squads through the Oberlin streets," Arthur adds. Yes, this was the Robert A. Millikan who was awarded the Nobel Prize in physics in 1923. Whether you become a great athlete or not, there is no better way to get on than to pick good teachers and follow them—even at dusk and in shorts!

Arthur Laird graduated with an A.B. degree in 1894. After teaching at Grand River Institute in Austinburg, Ohio, for two years, he secured a scholarship at the University of Pennsylvania Medical School from which he graduated in 1900. During his stay at the University of Pennsylvania Medical School, Dr. Laird crossed the paths of noted characters. In pathology, he met the famed Dr. John Guiteras, who went to work in Havana with the men who solved the problem of how yellow fever is transmitted. Guiteras led Dr. Laird into a small, special group of men studying problems in general pathology and bacteriology. An "unpopular course" that Dr. Laird entered was in bacteriology given by Dr. Alexander Abbott, a relative of William Osler. Abbott had written a text on bacteriology, which was complete for that period of rapid development. When Simon Flexner took Professor Abbott's place in pathology at Pennsylvania, Dr. Abbott asked that Dr. Laird might have a corner in the laboratory to continue his studies and acquire practical experience

"in the staining of tissues and preparing media for bacteriological investigations." Note how the leaven of native application and willingness to work was materializing. Dr. Laird tells of an episode in Abbott's laboratory: "One day a handsome, somewhat austere gentleman came into Dr. Abbott's laboratory. He seemed displeased that the professor was absent and asked me if I happened to have the keys to the Snake House. I took him in there, since he said he was a close friend of Dr. Abbott and was interested in cobra venom. After seeing what he wanted, he left, saying, 'Do tell Professor Abbott that Weir Mitchell called'."

Dr. Laird was licensed to practice in New York after his graduation and, in the fall of 1900, was employed as an assistant to Dr. George Blumer, professor of pathology in the Albany Medical College and director of the Bender Laboratory. Here Dr. Laird met, among others, a fellow student, Harold E. Robertson, who later came to the University of Minnesota and the Mayo Clinic. The Bender Hygienic Laboratory was not only a laboratory where pathologic specimens were examined but also where various tests were performed for the Albany Health Department and for practicing physicians, such as blood counts, hemoglobin determinations, sputum examinations, and diphtheria cultures. For this sort of work, Dr. Laird's experience at the University of Pennsylvania had prepared him well, and he soon became lecturer on clinical microscopy at the Albany Medical College! This was the beginning of one of his most pleasant associations—that of his contact with medical students.

George Blumer was close to William Osler and sent Dr. Laird for a three months' "refresher course" in Baltimore. This course was unpopular with the Hopkins students "because the crowd around the great teacher was inclined to keep them too far back." It was ever thus. Later, Blumer went on to become a well-known internist, and Dr. Laird, who could have been an internist of note, found himself deflected by illness into the field of tuberculosis.

Lest this sketch become a volume in itself, I must hasten over much with which current readers are fully familiar, but before leaving Dr. Laird's days at the Bender Hygienic Laboratory, one more tale: After Reed, Guiteras, and Carrol had already proved that yellow fever was transmitted by mosquitoes, a box arrived at the laboratory. Dr. Laird, with his complete confidence in the judgment of his fellow investigators, followed the directions accompanying the box to the letter. The directions stated that the box contained *Stegomyia* larvae and that Dr. Laird was to "put them in the incubator and let them hatch into mosquitoes. Then put your hand into the apartment and let the ladies bite you. When they have laid their eggs, send them back to us." When all this was completed, in the interest of finding out a little more about the yellow fever vector, Dr. Laird went on his serene way, having acquired neither yellow fever nor fame. Such, in general, has been his whole life—quiet, self-effacing efficiency.

Somewhere in the midst of his manifold laboratory activities, Dr. Laird came down with diphtheria. After a long quarantine period, because of repeatedly positive throat cultures from his own laboratory, he was finally released, but then pneumonia developed. Dr. Henry Hun, for whom Dr. Laird had been an office assistant, made a diagnosis of pulmonary tuberculosis which was upheld by the opinion of a consultant. Dr. Laird's own estimate of the situation now, in retrospect, is that the tubercle bacillus was never demonstrated, but his chest films show "a lot of boiler scale." In any event, the diagnosis was ominous enough at the time. He returned to Pittsfield in the Berkshires and "cured" himself. After this "cure," Dr. Hun recommended a visit to Trudeau at Saranac Lake. Dr. Laird made the visit, became interested in tuberculosis, and, for several years during his vacations, he acted as an assistant on the staff at Saranac Lake. His interest in tuberculosis grew, stimulated no little by attending the 1908 International Tuberculosis Congress in Washington, D. C.* In 1910, Dr. Laird stayed on for the whole year at the Saranac Lake Laboratory. Here I met him while I was on a tour visiting various tuberculosis institutions. The upshot of this meeting was that Dr. Laird came to Duluth late in 1911.

From the time he came to Duluth, his every effort was spent in service to his fellows. Nopeming Sanatorium became more and more active, and Dr. Laird was not only its superintendent but practically "Mr. Nopeming" in every regard. This service was uninterrupted to the time when the superintendency was passed over to the late Dr. Arvid Hedberg, his faithful associate. In the summer of 1917, Nopeming Sanatorium loaned him as a contract surgeon to Fort Snelling in Minneapolis where, with the late Dr. W. J. Marcle and others, he made physical examinations of the chests of soldiers. Later, he was called overseas as an employee of the Commission for Prevention of Tuberculosis in France. He returned in May of 1918 and promptly became engulfed in disaster relief following the 1918 fire in the region around Duluth. Just in passing, Dr. Laird brought back with him to Nopeming an orphan who took his name and became George Laird. Needless to say, the boy has made good.

Dr. Laird attracted and retained on his medical staff at Nopeming men like himself, and soon there was the best of rapport with the University of Minnesota and with the Mayo Foundation. Nopeming became a center for investigation and not just a rest home for consumptive patients enroute to the cemetery. Never was a sanatorium, which grew to a total of 300 beds, managed with less intramural strife and commotion than Nopeming. Dr. Laird grappled with every problem arising and hewed out of the forest

a delightful, sheltered retreat for the sick in heart and soul—those who were tortured by physical, personal, and home problems alike. He met all newcomers without obvious use of disciplinary rules and orders. His was the calming touch in the face of the rigid dedicated adherence to the regimentation of "rest and fresh air," which he had brought with him from his contact with Trudeau, Kinghorn, Baldwin, Lawrason Brown, and others at Saranac Lake. The superintendent of Nopeming was the Great White Father to patients, staff, nurses, and employees. The days of effective antibiotics were slow in coming. The great steps in surgery—collapse, phrenic resection, and partial or total pneumonectomy—were only later to lift from the conscience of the medical staff some of the burdens that chronic illness imposes upon all who must spend their time in supporting morale and lending hope. Dr. Laird lent morale to everyone, including the efficient but occasionally intemperate engineer. He has always been strictly temperate without being a fanatic about it, and he drew into the Nopeming family the kindly interest of the Finnish and Scandinavian neighbors.

When Dr. Laird came to Nopeming in 1911, some question regarding his health remained in my mind. He was able to work so persistently and intently that we found ourselves, on the one hand, applauding his zeal and, on the other, fearful lest it would interrupt his "cure." I have long since ceased to worry about his health, however. He has not only retained his tremendous energy and his health, but he has led several thousand people through illness and back to useful lives.

Over and above these technical accomplishments—in a way they were the day's work for him—rises Dr. Laird's greater example of a superbly poised gentleman and scholar. Soft of tread and speech, I have never heard of his taking advantage of anybody or, indeed, of his being angry with anyone. He and his wife, Elizabeth, live at 231 East Victoria Street, Duluth. As one would suspect, they hold sort of perpetual open house. People such as the Arthur Laids never really retire; both are continuing to pursue the interests to which they have given long and effective lives. Mrs. Laird was for years on the faculty of the Teachers College, which grew into the present husky branch of the University of Minnesota, known locally as UMD. Dr. Laird has written extensively on many medical subjects. He has diligently avoided the restricting collar which narrow specialization ties around the neck of too many young physicians. He has been on all sorts of boards and committees as one would infer from his being ever willing to underwrite any health movement that comes along. It is in his blood to do so. He has been the recipient of many offices and honors, but none is so convincingly demonstrative of the feeling his fellow workers have toward him as the annual Arthur T. Laird Lectureship named for him by the Board of Directors of the Tuberculosis and Health Association of St. Louis County.

*EDITOR'S NOTE: Dr. Tuohy attended this same Congress, although he and Dr. Laird didn't meet until later. However, Dr. Tuohy *did* bring back to Minnesota from that Congress convictions that gave birth to our present sanatoriums.

Dr. Laird came from great seed. It fell on fallow ground in Minnesota. No more need be said.

The following article by Emerson C. Kelly, M.D., is reprinted from the December 1958 issue of the *Bulletin of the Albany County Medical Society*.

Minnesota—An annual lecture on chest diseases has been named the Arthur T. Laird Lectureship on Chest Diseases by the County Tuberculosis and Health Association. These lectures for the St. Louis County Medical Society, set up by the Christmas Seal group, will bring nationally known physicians to Duluth to speak on chest diseases. Dr. Laird, retired superintendent of Nopeming Sanatorium, served in that position thirty-two years. He was a member of the committee that mapped reorganization of the Anti-Tuberculosis Society of St. Louis County. He served as a member of the Rockefeller Foundation-sponsored Commission for Prevention of Tuberculosis in France in 1917-1918. The lectureship in Dr. Laird's

honor recognized "his long, vigorous interest and past accomplishments in the field of tuberculosis control."

Dr. Laird came to Albany after receiving the degree of M.D. from the University of Pennsylvania in 1900. He taught clinical microscopy at the medical college and was on the staff of Bender Laboratory. In 1902, he joined the Medical Society of the County of Albany and was appointed resident physician at the Almshouse (no apparent relationship). For the *Albany Medical Annals*, he wrote several papers on diphtheria, antitoxin, tuberculosis and bacteriology and reviewed books and articles in his special field. He was active in the profession of medicine in Albany until 1911 when he moved to Duluth. We are pleased to know that another one of our boys has received renown.

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House of Open Doors, by HAROLD HOLAND, 1958. Milwaukee: Wisconsin Anti-Tuberculosis Association. \$3.00.

It is fortunate when the history of an organization can be written by one who has been intimately associated with it for a long time and, therefore, writes from firsthand information.

Harold Holand, the author of this book, has been with the Wisconsin Anti-Tuberculosis Association nearly thirty years. He was invited to join the staff by Dr. Hoyt E. Dearholt, a pioneer and founder of the organization. He continued this close association until Dr. Dearholt died in 1939. Moreover, Mr. Holand spent three years in institutions as a patient himself, which gave him an understanding of tuberculosis such as nothing else could.

Starting an apprenticeship with Dr. Dearholt in 1930 as a social research assistant, he manifested special interest also in editorial work. Now he is director of the Social Research and Publications Departments and managing editor of *The Crusader*, the organization's official monthly journal. There is almost no one now living in his organization who has personally known so many of Wisconsin's great leaders who have made some of the finest accomplishments in the world leading toward eradication of tuberculosis both in people and animals.

The primary purpose of this book is to tell the story of the tuberculosis control campaign in Wisconsin over the past half-century or more, particularly as it has been spearheaded by the Wisconsin Anti-Tuberculosis Association. But the book



has a wider significance. The chronicle of the Wisconsin Anti-Tuberculosis Association's first fifty years might well be called a case study of American democracy at work.

Unlike the pattern in Europe, the development of health and welfare services in the United States has not been state inspired but has arisen out of pioneer efforts of voluntary groups of civic-minded citizens who banded together to seek remedies of social ills. They have sponsored and carried on social research studies, fought for needed legislation, set up demonstrational projects, helped to maintain and elevate the standards of service in the official agencies they have helped to bring into being, and waged unceasing campaigns of public and, to a lesser extent, professional education.

The National Tuberculosis Association was the first of the great national voluntary health agencies and, to a large extent, has shown the way organizationally and program-wise for the other national health groups. One of its happy organizational characteristics is the fact that its state constituent associations are not considered as branch offices. These state associations have an in-

dependent existence and much latitude in program development, although they are guided by the requirement of certain standards of performance in order to share in Christmas Seal revenues.

Thus, each state tuberculosis association has had much latitude in developing its own program and in experimenting in ways by which other states can profit. The Wisconsin Anti-Tuberculosis Association pioneered early in campaigning for sanatoriums and public health nursing, in sending traveling clinics out on the highways, in tuberculin skin testing in schools, and in offering vocational rehabilitation services to patients in all Wisconsin sanatoriums.

In telling the association's story, the personalities of the men and women who dreamed its dreams and fashioned with loving care the tools to bring those dreams into reality have been recreated. This necessitated much digging into old newspapers and magazines, into files of minutes of boards of directors and staff conferences, and in the reminiscences of early leaders.

Fortunately, this objective research was supplemented by the author's many years of close personal association with men and women like Dr. Hoyt E. Dearholt, Will Ross, Louise Fenton Brand, Dr. T. L. Harrington, Dr. A. A. Pleyte, and others to whom Wisconsin and the nation owe so much in tuberculosis control.

This book should be read and studied by every person who works with tuberculosis in any capacity.

J. A. MYERS, M.D.

(Continued on page 24A)

Foreword

The shoulder-hand syndrome is a very real problem in pain control. It deserves to be considered from all possible angles. The article by Eugene Neuwirth and Louis Gayral entitled "The Shoulder-Hand Syndrome, Syndrome of Barré-Lieou, and Osteoarthritis of the Cervical Spine" focuses attention on part of this problem. This article should be helpful to anyone who is confronted with this strange phenomenon.

JOHN S. LUNDY, M.D.

The Shoulder-Hand Syndrome, Syndrome of Barré-Lieou, and Osteoarthritis of the Cervical Spine

EUGENE NEUWIRTH, M.D., and LOUIS GAYRAL, M.D.
Great Neck, New York, and Toulouse, France

THE SHOULDER-HAND SYNDROME (Steinbrocker) comprises complete and incomplete forms which have been known to physicians for years under a variety of names. The outstanding clinical feature of the syndrome is the simultaneous occurrence of painful shoulder disability with homolateral involvement of the hand and wrist. The elbow joint usually escapes implication. Bilateral forms of the syndrome have also been reported. Earlier writers failed to recognize that the involvement of both the shoulder region and the hand is due to the same pathogenic mechanism of sympathetic origin.

The disorder passes through several stages. In the first stage, which may last from several weeks to several months, there is diffuse pain, and vasomotor disturbances appear. At the onset, pain may be in the hand and fingers or in the shoulder or in both parts simultaneously. The pain is of the burning type and is commonly associated with restricted mobility. Soon vasomotor disturbances occur in the hand and fingers. The affected part becomes edematous. The skin is smooth and moist with elevated temperature; at first, it is pink but becomes cyanotic later. The fingers and wrist are held slightly flexed in a clawlike position.

EUGENE NEUWIRTH is a specialist in physical medicine and rheumatic diseases with offices in Great Neck, New York.

LOUIS GAYRAL is instructor in neurology and psychiatry at the University of Toulouse, Toulouse, France.

In the second stage, which is of about the same duration, the swelling in the hand subsides, and the function of the involved parts improves. However, acute attacks of pain and edema still occur. Trophic changes of the skin appear in the second stage, which become worse in the third or final stage. The skin is smooth, glossy, and atrophic, and hypertrichosis often develops on the dorsal surface of the hand and fingers. Atrophy of the subcutaneous tissues and of the intrinsic muscles of the hand may be pronounced. Contracture of the flexor muscles, with retraction of the tendons and the palmar and digital fasciae, create a clinical picture very similar to or identical with that of Dupuytren's contracture. Progress of the disorder is indicated by considerable wasting of the hand and decreased mobility of the wrist, the finger joints, and the shoulder. The upper extremity is held in the position of adduction and internal rotation. In the early stages of the syndrome, roentgenograms of the bones of the hand and humeral head show patchy osteoporosis which later becomes diffuse.

Many clinical forms and etiologic varieties of the shoulder-hand syndrome have been described. In about one-third of the cases, no exact etiologic factor can be found (idiopathic variety). The condition may develop after minor or major trauma, such as a contusion, sprain, or fracture, or after surgical intervention, when it may be associated with the causalgic syndrome described by Leriche or with erythromelalgia.

Weir Mitchell observed cases of the shoulder-hand syndrome which were characterized by painful vasodilatation. Post-traumatic osteoporosis has been held by Kienböck to be the expression of trophoncrosis. It is generally recognized that the shoulder-hand syndrome may appear in the wake of myocardial infarction, about three to sixteen weeks after the occlusion of the coronary arteries. Coronary artery disease without infarction may also lead to the development of the shoulder-hand syndrome via reflex neurovascular mechanisms. The disorder has also been observed after occlusion of the axillary artery.

The syndrome has been noted in the course of neurologic diseases, such as syringomyelia and tabes. Cases of postherpetic shoulder-hand syndrome have been reported by Layani, Charcot, de Takats, and Decourt, and others have described posthemiplegic forms.

The treatment of choice is procaine block of the stellate and upper dorsal ganglia.

Oppenheimer ascribed the development of the syndrome in his patients to osteoarthritic constriction of the intervertebral foramina in the cervical spine with compression of their contents. Numerous writers share this view. We have observed two patients in whom the syndrome appeared in association with the posterior cervical sympathetic syndrome of Barré and Lieou. The source of this latter condition is commonly considered to be involvement of the posterior cervical sympathetic system consequent to cervical osteoarthritis. In one of our patients, the shoulder-hand syndrome developed rapidly; in the other, evolution of the disorder was slow.

CASE REPORTS

Case 1. A.D., a 34-year-old white woman, had been afflicted with cervical osteoarthritis for the past six years. The patient complained of nervous symptoms, which consisted of headaches, persistent pain in the occipitocervical region, ocular and vestibular disturbances, paresthesia, and manifestations of paroxysmal neurosis. In 1949, she became pregnant. For obstetric reasons, however, the pregnancy was terminated in the fourth month.

Symptoms of cervical osteoarthritis had been present from the beginning of the pregnancy together with head pains, vertigo, facial neuralgia, pain in the right upper extremity, and paroxysmal attacks of pain in the neck. At about the same time, the patient began to feel pain in the right shoulder, the mobility of which became progressively inhibited. Examination disclosed that the shoulder was tender to pressure and was slightly swollen, as in bursitis. The right hand, fingers, and wrist were swollen and painful, and their mobility was restricted. The skin was smooth and felt cold to the touch. The hand was held in a flexed position. Roentgenograms of the head of the right radius and the terminal phalanges of the fingers revealed demineralization.

Pain was the chief manifestation and was best relieved by means of repeated blocks of the right stellate ganglion with procaine.

During another pregnancy, no shoulder-hand syndrome developed, although the patient still had cervical osteoarthritis associated with the syndrome of Barré-Lieou.

Case 2. For the past thirteen years, D.C., a 71-year-old white woman, had been suffering from paralysis agitans, or Parkinson's disease, associated with muscular rigidity and tremor. On numerous occasions, she experienced pain in the right hand, which showed trophic changes and acrocyanosis. The skin was smooth, moist, and slightly drawn. Movement at the wrist was limited.

Painful disability of the right shoulder developed later in association with arthritic changes and decreased motion. The oscillometric index was much lower on the right side than on the left. Roentgenograms of the right hand disclosed the presence of an osteotrophic lesion.

The disorder had started about one year previously in the wake of a long period of pain and varied complaints attributed to osteoarthritis of the cervical spine, which had been visualized by roentgenogram. At examination, the patient presented a typical posterior cervical sympathetic syndrome (Barré-Lieou) with pain and paresthesia in the back of the head and neck, headache, tinnitus, vertigo, and hypotension of the central retinal arteries.

The disorder of the right upper extremity began in the hand with pain and trophic alterations followed by painful shoulder disability on the same side. The elbow remained free. The parkinsonian contracture was more pronounced on the left than on the right.

The condition responded well to physical medicine procedures, injections of procaine about the joints, and local hydrocortisone injections.

COMMENT

The pain and neurotrophic articular changes of the shoulder-hand syndrome may be secondary to a generalized trophic syndrome of cervical sympathetic origin, such as that of Barré-Lieou, and the shoulder-hand syndrome may perhaps be the first manifestation of the posterior cervical sympathetic syndrome.

It is noteworthy to encounter the shoulder-hand syndrome in cases in which a pathologic lesion of the cervical spine engenders sympathetic disturbances which are more pronounced than the symptoms of the cervical spondylosis itself. Since the sympathetic nervous origin of the syndrome of Barré-Lieou has been established, it is important to recognize that the shoulder-hand syndrome may have a sympathetic source in the sympathetic centers of the cervical segment of the spinal cord and in the sympathetic nerve fibers traveling in the ventral nerve roots and nerves arising from the cervical cord. Excitation of these sympathetic elements, for example, through osteophytic spurs, spreads through the anatomic and physiologic distribution of the great posterior cervical sympathetic network.

Book Reviews on Pain

RADIOACTIVE ISOTOPES IN CLINICAL PRACTICE, by EDITH H. QUIMBY, Sc.D., professor of radiology (physics), College of Physicians and Surgeons, Columbia University; SERGEI FEITELBERG, M.D., director, Physics Department, Mount Sinai Hospital; associate clinical professor of radiology, College of Physicians and Surgeons, Columbia University; and SOLOMON SILVER, M.D., chief, Thyroid Clinic, Mount Sinai Hospital; associate clinical professor of medicine, College of Physicians and Surgeons, Columbia University, 1958. Philadelphia: Lea & Febiger, 451 pages, 97 illustrations. \$10.00.

Part I of this volume covers basic physics in detail; part II, instrumentation and laboratory methods; and part III, clinical applications. For a knowledgeable idea of radioisotopes in clinical practice, one could do no better than study this book.

JOHN S. LUNDY, M.D.

PAIN, by HAROLD G. WOLFF, M.D., professor of medicine (neurology), Cornell University Medical College, New York City, and STEWART WOLF, M.D., professor and head, Department of Medicine, University of Oklahoma School of Medicine, Oklahoma City, 1958, ed. 2. Springfield, Illinois: Charles C Thomas, 121 pages. \$4.25.

This excellent book contains many illustrations of the innervation of parts of the body where pain may occur. It presents a thorough discussion of the nature of pain, the pain pathways, and the fundamental aspects of dealing with pain that must be understood in order to adequately handle this problem, which concerns at least half of the patients who are seen by the physician. A list of 160 references and an index are included. This book should be required reading for senior and graduate medical students.

JOHN S. LUNDY, M.D.

APPLIED MEDICAL LIBRARY PRACTICE, by THOMAS E. KEYS, with chapters by CATHERINE KENNEDY and RUTH M. TEWS, 1958. Springfield, Illinois: Charles C Thomas, 495 pages, illustrated. \$10.75.

In my review of Keys' *The History of Surgical Anesthesia* (New York, Schuman's, 1945), I said, "There can be no doubt that this is the best and most thorough presentation of the history of surgical anesthesia that has yet been written" (J.A.M.A. 129:713, 1945). After several years, this statement still stands.

I wish that Keys' new book on medical library practice, or one like it, which was equally as good in this field, had been published when I was a student at medical school. Without it, I had an unsatisfactory library experience. I used the library in the manner of a fly, buzzing from one book to another without any coordinated knowledge, and, at that time, I really did not appreciate the library and its vast potentialities. I still marvel today at the ease with which librarians can find out for me what I would like to know. They apparently do it

without great effort, but, underneath it all, I am sure they have a deep understanding of library practice.

The volume under review represents the accumulated experience of Mr. Keys and his associates at the Mayo Clinic Library for almost twenty-five years. During this time, the author has seen the library grow from a collection of about 30,000 to more than 100,000 volumes. Mr. Keys calls the medical library a "laboratory for the physician. It is a workshop for the literary physician, and it is just as important to him as a well-equipped laboratory is to the experimental bacteriologist, the hematologist or the surgical pathologist" (p.4).

Other chapters by the author consider "The Administration of a Medical Library," "The Acquisition of Books and Journals," "Cataloging and Classification," "The Medical Indexes," "Fundamentals of Medical Bibliography," "Reprints and Their Orderly Arrangement," "The Place of the Medical Library in Graduate Medical Education," "Research Libraries in Medicine," "The Development of Private Medical Libraries," "Representative Medical Libraries in the United States," "Medical Publishers and Medical Books" from the earliest times to the present including the first history of medical publishing in the United States, the importance of medical history, and the future of library services. The chapter on "Abstract Journals" was contributed by Miss Catherine Kennedy, associate librarian at the Mayo Clinic, and the one on "The Patient's Library" by Miss Ruth Tews, the hospital librarian there.

In addition to these chapters, this well-packed volume contains 5 appendices as follows: (1) "Publishers of Medical and Related Books in the United States: Arranged by City"; (2) "Medical Bookdealers in the United States Who Handle New Books: Arranged by City"; (3) "Antiquarian Booksellers in the United States dealing in Medical and Related Subjects: Arranged by City"; (4) "Top Journal Circulation of Unbound Issues for 1954-1956 in the Mayo Clinic Library"; and (5) "Medical Works in Facsimile, a Bibliography" with a "List of Facsimiles." The index, which is extensive and easy to use, covers 44 pages.

This book will be especially useful to the physician with an inquiring mind who wishes to better himself and also to contribute to the progress of medicine. It will teach him how to use the library intelligently and, thus, will save him many hours of time and, on a few occasions, no doubt, much embarrassment.

Mr. Keys has an interesting quotation at the beginning of each chapter, and I shall requote the one from the late Charles H. Mayo: "I have never been afraid of the dietitians or the infant-feeding experts or any of those people. It's the people who take care of my brain babies, the librarians and the editors, of whom I always have been afraid" (p. 91).

After becoming familiar with this volume, the reader will not be afraid of the librarians and the editors but will become their friends and will profit by the continued use of the library to the betterment of his understanding of medicine.

The appendices contain a mine of useful information. If the reader should contemplate publishing a book, it would be well if he were to become familiar with the chapter, "Medical Publishing in the United States," which gives thumbnail sketches of the leading American firms.

If the reader would like to visit a medical library in his travels, he can find out important things about many of the leading libraries as arranged by cities. If he would like to visit new bookdealers or antiquarian booksellers, they are listed by city, and if he would like to know what journals are read the most in the Mayo Clinic Library, he will find that these journals are also listed.

All in all, Keys' *Applied Medical Library Practice* is an invaluable book for the physician, the librarian, the administrator, and the medical educator. It deserves a large circulation. A much improved group of physicians would graduate from medical schools if each student were required to read this book and make a written review of it for credit.

JOHN S. LUNDY, M.D.

THE AMPHETAMINES: THEIR ACTIONS AND USES,

by CHAUNCEY D. LEAKE, Ph.D., professor of pharmacology, Ohio State University, Columbus, 1958. Springfield, Illinois: Charles C Thomas, 167. pages. \$4.50.

This book sets forth the various opinions that are held concerning the amphetamines. It should appeal to any physician who must deal with conditions in which stimulating drugs might be employed to advantage. The question of the use of dextro-amphetamines to improve the effect of analgesics for relief of pain is being considered at the moment, so that this excellent discussion of the amphetamines is timely.

Many references and an index are included. The book is easily read and should prove useful to most physicians.

JOHN S. LUNDY, M.D.

Current Literature on Pain

COMPLICATIONS OF THORACIC SURGERY, by H.

D. ADAMS and D. P. BOYD: S. Clin. North America 37:615-624, 1957.

"Thoracic surgery, which now includes many types of operations in relation to the lungs, esophagus, and cardiovascular systems, has become a large and complex field of surgical endeavor. The safety and the prevention of complications in this important field depend basically on a thorough knowledge of the anatomy, physiology, and dynamics of these thoracic systems. . . .

"Of great importance has been the development of intratracheal anesthesia and the evolution of the anesthesiologist as a physiologist who can be depended upon to maintain these important vital functions during many of these long and hazardous operations. The strict avoidance of anoxemia, the maintenance of an unobstructed airway, controlled respiration, and the management of secretions during and after operation, promptly utilizing tracheal aspirations and even tracheotomy when indicated, prevent many pulmonary complications."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49. Copyright by JOHN S. LUNDY.

TREATMENT OF ACUTE CEREBROVASCULAR ACCIDENTS, by M. B. BENDER: M. Clin. North America 41:799-808, 1957.

"In intracranial bleeding, especially subarachnoid hemorrhage, headache is sometimes excruciating and very distressing. Relief should be offered by (a) ice bag to the head, (b) lumbar puncture and withdrawal of sanguineous fluid, (c) analgesics in combination with one of the promazines. . . .

"In cases of intracranial hemorrhage, especially in older patients with longstanding history of hypertension, there has been a tendency to treat the elevated blood pressure with hypotensive drugs. . . . Decreased blood pressure may cause decreased cerebral blood flow and thus induce anoxia of brain tissue with subsequent neurologic deficits. . . .

"In recent years, there have been attempts to treat intracranial vascular accidents by decreasing brain me-

tabolism through maximal lowering of body temperature. . . . Before treatment for embolization is instituted, one must be aware that pathologically cerebral infarcts are frequently hemorrhagic and that embolism in the brain often produces such hemorrhagic infarcts. As for therapy, the use of anticoagulants first comes to mind, particularly since the suspected source of the emboli is a mural thrombus or valvular disease. . . .

"A large variety of vasodilators has been tried in all types of occlusive cerebral vascular disease. . . . Probably the best vasodilator is a 5 to 7 per cent mixture of CO₂ and air by inhalation. . . . Cortisone therapy has been reported to be successful. . . . Stellate ganglion block is achieved by the introduction of 10 cc. of 2 per cent Novocain through a needle directed just above the clavicle to the transverse process of the seventh cervical vertebra. The amount injected is sufficient to paralyze the inferior or middle cervical ganglion or the cervical sympathetic trunk with resultant Horner's syndrome, but a good deal of the Novocain is absorbed into the circulation. This method of treatment is alleged to produce an early improvement of neurologic signs and symptoms, particularly in cases in which spasm or insufficiency is suspected. It certainly is of no value in cerebral hemorrhage or in severely arteriosclerotic processes. . . .

"Because of inadequate statistical studies, it is impossible to conclude which of these treatments is genuinely effective."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49. Copyright by JOHN S. LUNDY.

INFUSION TREATMENT OF SHOCK. ALKALI AND ACID IN SHOCK TREATMENT, by F. M. ALLEN: Arch. Surg. 75:210-223, 1957.

"The existing situation in the fluid therapy of shock has been accurately summarized by Wiggers. It is generally supposed that the beneficial effects of sodium chloride do not depend solely or largely on its ability to restore plasma volume. It must be due to the action of the sodium or chloride ions or of the NaCl molecule. Illustrations

tive of the first sentence is the superiority of saline over plasma or dextran solution. The problem of the second sentence is explored in the present paper. . . . Tourniquet shock, which was first standardized in rats, was produced in dogs. . . .

"The confusion created by the considerable benefit of any sodium salt solution in shock necessitates using severe shock for accurate comparisons. The fatal effect of the customary alkaline solutions in severe hemorrhagic or traumatic shock is indicative of less obvious harm in milder shock and of the need to discontinue this clinical practice.

"The assumption of the plasma bicarbonate percentage as the measure of a supposed 'alkaline reserve,' a concept which never had any scientific foundation, is disproved experimentally. Fatal alkalosis can exist with plasma bicarbonate concentrations within normal limits. On the other hand, the reduced plasma bicarbonate values in shock are misleading, since, in dogs with severe hemorrhagic or tourniquet shock, the maintenance of these values up to the theoretical normal level with the clinically recommended alkaline solutions guarantees death.

"The present work is a rehabilitation of the chlorine ion, after the exclusive attention heretofore given to the beneficial sodium ion. Furthermore, while sodium without chlorine is harmful to the extent stated, theoretical and experimental evidence is suggested for the possible value of chlorine without sodium, namely, in hydrochloric acid. The few experiments necessitates postponing a decision on the recommendation of acid in shock treatment. Even if the impression of benefit should be found erroneous, the excellent tolerance of considerable quantities of acid, in contrast to the harmfulness of alkali, in a condition universally classed as an acidosis is still a striking phenomenon. Sodium chloride and its components are specific in shock treatment, as against all other molecules or atoms. The ramifications of the problem in diabetes and other fields invite further investigation."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49. Copyright by JOHN S. LUNDY.

RESPONSIBILITIES AND METHODS IN MAINTENANCE OF HOMEOSTASIS IN UNCONSCIOUS PATIENT, by RALPH ADAMS and AILEEN E. ADAMS: J.A.M.A. 167:1090-1093, 1958.

"The physician is often called in an emergency to take care of patients who have lost their normal defense mechanisms. There are various situations in which the protective reflexes are in abeyance due to coma, injury, or a number of diseases, and the patient is in grave danger from hypoxia unless something is done to pre-

vent it. Complex treatment is rarely called for. Application of clinical judgment and simple practical measures usually bring about a complete recovery, but lack of prompt intelligent action may mean death or survival with irreversible brain damage. . . .

"Airway obstruction may be encountered from loss of muscle tone and/or secretions of blood and vomitus occurring in induction and emergence with anesthesia; in coma from head injuries, diabetes, or barbiturate poisoning; in face or neck diseases, such as goiter, jaw fractures, and laryngeal edema; in severe pulmonary disease; and in bulbar paralysis. . . .

"Respiratory distress is often characterized by poor ventilation, either because of instability of the chest wall, as in crush injuries, or because of poor muscular action, as in paralytic disease. In other instances, inadequate oxygen transfer occurs because of pulmonary or cardiac disease. These may all be aggravated by secondary airway obstruction by secretions. Hence, the first line of treatment must include careful clearing of the air passages. . . .

"Continuous bleeding, as in maxillofacial injuries; the inability to swallow secretions, as in bulbar poliomyelitis; laryngeal or tracheal edema, obstruction, or compression; and retention of bronchial secretions are urgent indications for endotracheal intubation, with either a tube with an inflatable cuff or a pharyngeal pack used to prevent contamination of the trachea. Intubation or tracheotomy is also occasionally necessary in patients with laryngeal edema, or with compression, such as may be produced by retrosternal goiter. . . .

"So far, only the establishment of a patent airway has been considered, and it is emphasized that this necessity takes precedence over all else. Once this has been achieved, it may still be desirable to give the patient additional oxygen. . . . Every emergency receiving room and every place where anesthesia, whether general, spinal, or local, is employed must be equipped with three things: (1) an emergency endotracheal set, (2) an efficient suction apparatus, and (3) an anesthesia or oxygen apparatus capable of administering oxygen under positive pressure. . . .

"A few drugs should also be available on the emergency trays: atropine to dry secretions and block vagal cardiac reflexes, and some vasopressors, one with a predominately cardiac action, such as ephedrine or epinephrine, and one with a peripheral vasoconstrictive action, such as Neo-Synephrine. A barbiturate, such as pentobarbital sodium, should also be on hand to counteract the toxic effects of local analgesic agents. Should efforts at resuscitation fail and cardiac arrest result, it is always worthwhile to open the chest and institute cardiac massage."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49. Copyright by JOHN S. LUNDY.

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BOOK REVIEWS

(Continued from page 171)

Vascular Spiders and Related Lesions of the Skin, by WILLIAM B. BEAN, M.D., 1958. Springfield, Illinois: Charles C Thomas. \$8.50.

For an author to write a book review of his brain child is as risky and heady an experience as criticizing one's own wife or child. Also, it may produce somewhat the same sensation as writing one's own obituary. Any book written by someone deeply immersed in a subject contains much autobiography. Reviewing one's own book then becomes a form of auto-autobiography.

I shall begin my comments with a series of quotations.

"I was discouraged and a little disillusioned that none of my splendid clinical teachers at Johns Hopkins, Harvard, or Cincinnati could answer my annoying questions about spiders. I began to collect data, studying spiders wherever I found them, approaching them from all sides and in all places.

"Anyone's review of his own motives is apt to be distorted by conscious or unconscious shifts of emphasis as well as by the subtle reinterpretation which time brings.

"If clinical trivia and ephemera

illustrated no general principles in medicine, I would not care. I have never been able to stimulate or simulate interest in popular medical problems just because they were popular. Nevertheless, small lesions may help us understand larger ones and lead to generalizations bearing directly upon practical medicine.

"No part of development, growth, normal function, disease, aging, or death is without its intimate vascular context. In spite of these truisms and in spite of much desultory and concerted study, there are large chasms of ignorance which disfigure and Balkanize in separate, mutually excluding systems our knowledge of blood vessels."

The organization and plan of the book need some comment. By far the longest chapter deals with spiders and palmar erythema. Thereafter, the vascular lesions of the skin are grouped about a common etiologic mechanism or process, a region of the body, or a common clinical complication. Since several might have been put in more than one place, the Table of Contents indicates this in the headings of several chapters. For instance, hereditary hemorrhagic telangiectasia, which I call Osler's disease, appears in the chapter on congenital

lesions but might have appeared with vascular lesions which increase with aging, or the chapter on enteric bleeding with diagnostic skin lesions.

With the exception of Fabry's syndrome and epidemic dropsy, I have observed all the lesions and disorders under discussion. My own personal contributions to natural history include the first relating of spiders and palmar erythema to both liver disease and pregnancy, the use of infrared photography to produce vascular obliteration of red lesions as well as to accentuate the appearance of blue ones, an elaboration of the dermovascular changes in the syndrome of metastatic carcinoid, the demonstration of secular changes in the lesions of Osler's disease, and the dynamic state of changing patterns of small vessels in normal skin. I have brought together the congenital dysplastic angiectases showing a tangential relation to Maffucci's syndrome while trying to escape the anachronistic errors of eponyms by avoiding many but using some. . . . I am not aware that others have described venous lakes, palmar varices, striate atrophy of the skin, dysautonomia in the adult or the combination of

(Continued on page 27A)

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BOOK REVIEWS

(Continued from page 24A)

vascular lipomas, ophthalmoplegia, steatorrhea, and phlebectasia into a possible syndrome, but I have not searched all possible repositories or even many textbooks on dermatology. The history of medicine reveals that few people really discover anything new, and many whose names are tacked onto a lesion or syndrome may be embarrassed to learn that others not only have described it before but better. At least I have resuscitated, if not discovered, many interesting vascular lesions.

Illustrations are a major problem in any book dealing with visible lesions of the skin. In my book, there are 2 colored plates with a total of 8 individual photographs. The picture of palmar erythema is especially good, and, except for the blurred detail of the spider covered with oil, the colored photographs convey their message. There are a total of 130 illustrations, not all of which give a very clear indication of the exact appearance of the lesion or process under discussion. Most of the photographs of spiders are good; the histopathologic sections are excellent; and the line drawings are effective. Some of the photographs of palmar erythema are

not very clear. A number of the comparisons of black and white and infrared photography present most excellently the startling contrast in such photographs. Several of the pictures of Osler's disease turned out extremely well, a few poorly. One of the most striking series of pictures, which were taken over a fifteen-year span, is the general physical appearance and x-rays of a patient with Maffucci's disease. Emphasis on the occurrence of a specific blue rubber-bleb nevus of the skin and gastrointestinal tract identifies a rare but easily recognizable syndrome. The photographs of mottling of the skin are, for the most part, not clear enough to add much. The mysterious anemic halo is emphasized and venous lakes, which hitherto have been totally overlooked, are emphasized.

In addition to the discussion of vascular spiders and palmar erythema, there are chapters on vascular lesions caused by humoral mechanisms, congenital and hereditary lesions and birthmarks, functional flushes and vascular patterns, neoplastic lesions, traumatic vascular lesions, vascular lesions which increase with age, abdominal and thoracic venous structures, nails and liver disease, enteric bleeding in pa-

tients with diagnostic skin lesions, and a miscellaneous section on lesions which defied classification. The references, nearly 1,000, are listed alphabetically and by number. The text is not broken up with a great many numerical superscripts or subscripts, the author's name indicating which reference is indicated except when there might be some confusion. There is a further breakdown listing all the references which have any bearing on the major subjects for extensive review if anyone is so inclined. There is an ample index and this with the full Table of Contents makes it easy to use the book for reference or cross reference. My conscientious efforts to make this a nearly perfect book naturally fell short of realization. I did not read the whole book again in review but have found one or two garbled sentences, at least one consistent misspelling of a French word, one example of the wrong font of type, and two mislabeled plates near the end of the book. A good many of the chapters begin with verses or quotations, ranging from my parody on Little Miss Muffet from Mother Goose to Oliver Wendell Holmes.

Whether I have made a substan-

(Continued on page 28A)

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BOOK REVIEWS

(Continued from page 27A)

tial contribution to clinical medicine or not remains for the future to judge, but this is a book which should be helpful in clinical diagnosis, and it has something of importance for physicians in every specialty in medicine. Surgeons as well as internists will profit by its study, and, trespassing as it does on some of the uncultivated and fallow meadows of dermatology, it should be of interest to specialists in skin diseases. Specialists in thoracic disease may find interest in the zona corona, cervical fringes, and capillary markings as well as clubbing of the nails. Even a urologist might find Fabry's syndrome, pheochromocytoma, pulsating metastasis from hypernephroma, and a few other items of help. This large miscellany of vascular lesions of the skin assembles in one book rare and common and important and unimportant disorders, lesions, or marks for study in convenient form. The price seems high but color plates are costly, and the publisher has a long way to go before he can share a modest title with the author.

WILLIAM B. BEAN, M.D.

The Management of Childhood Asthma, by FREDERIC SPEER, M.D., 1958. Springfield, Illinois: Charles C Thomas, 116 pages. \$4.75.

Very few manuals on the management of asthma in childhood have been published. This one, even though a brief discussion, is quite complete as far as practical aspects of the disease are concerned.

The basic principles of the nature of asthma, its diagnosis, etiologic factors, and management are simply outlined and well supported by references. The importance of the clinical history in asthma is very apparent throughout the manual. The major etiologic factors, which are the inhalants, epidermoids, and foods, are adequately explained. A simple technic of skin testing is also described, and the interpretation of skin testing versus clinical history is stressed. The chapter on food allergens is especially well documented and informative. The section on the treatment of the disease is written on a good practical level. Symptomatic measures are taken up as well as specific therapy (desensitization). The latter, which might be very confusing, is easily understood.

This manual should be most valu-

able for the pediatrician and the general practitioner.

EDWARD L. STREIN, M.D.

The Bases of Treatment, by NEWTON S. STERN, M.D., 1957. Springfield, Illinois: Charles C Thomas, 166 pages. \$4.75.

When a book agrees with the reader's way of thinking, he believes that it is good. It is so with *The Bases of Treatment*!

In a very easy and philosophic manner, this book presents to the doctor such an excellent appraisal of the art and science of medicine that by following its prescription he becomes a better doctor.

Under the following titles, a way of medicine is presented that cannot help but be useful to the physician: Confidence in the Physician; Diagnosis as a basis of treatment; Disease as a Disturbed Physiological Process; Orders, Fluid Balance, Diet, Electrolyte Balance, The Comfort of the Patient, Knowledge and Use of Drugs, Prevention of Disease, and Psychotherapy.

This is a worthwhile book to read and keep in one's library.

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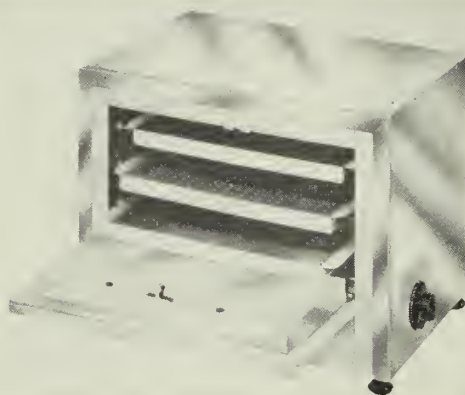
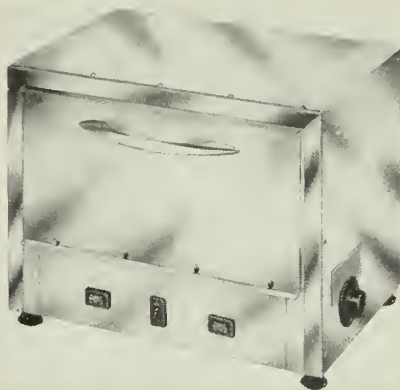
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News Briefs . . .

North Dakota

OPEN HOUSE was held recently at the new Hettinger Medical Center. More than 100 people were taken on conducted tours through the new building, which is of double-wall brick and tile construction. Occupying the Medical Center are Dr. W. J. Knickerbocker, Dr. Cameron, Dr. E. C. Sahlstrom, and Dr. O. J. Fuglie. Plans call for the addition of an adjoining parking lot this summer.

* * * *

DR. W. W. FREY, and DR. W. C. MEREDITH moved into their new office building in Drayton early in February. Under construction since last August, the building is about 30 x 60 ft. with an enclosed ramp leading to the hospital which it adjoins. The fully air-conditioned building contains 4 examining rooms, a treatment room, an x-ray room, and a dark room in addition to the office, waiting room, and utility rooms.

* * * *

DR. GORDON B. MAGILL, formerly associated with the Denver Clinic, has established practice in Fargo. Mrs. Magill, also a doctor, is school physician at Colorado Women's College. She plans to join her husband in practice in Fargo. Both physicians are graduates of Columbia University College of Physicians and Surgeons. During four years spent in Egypt, Dr. Gordon Magill, as an officer in the Navy, gained recognition for research in antibiotics.

* * * *

DR. KONSTANTIN SPARKUHL, a specialist in surgery who has practiced in Los Angeles since 1957, has become affiliated with the Harvey Medical Center. A native of Berlin, Dr. Sparkuhl came to the United States in 1932 and received his M.D. from the University of Southern California in 1943. After receiving a master of public health degree from Johns Hopkins School of Public Health, he became district health officer in Los Angeles. Later, he specialized in surgery for four years at Veterans Administration Hospital in Perry Point, Maryland, and then trained for a year and a half in chest and arterial surgery at the VA Hospital in Jackson, Mississippi. Among numerous medical groups of which he is a member are the American Public Health Association and the American Association of Chest Physicians.

* * * *

DR. ROBERT B. RADL, a physician with the Quain and Ramstad Clinic since 1936, left Bismarck in February to become medical director and administrator of the Santa Cruz County Hospital, Santa Cruz, California. Active in medical circles, Dr. Radl is certified by the American Board of Internal Medicine and is a fellow of the American College of Physicians and the American College of Allergists.

Minnesota

THE AUSTIN CLINIC recently moved into its ultra modern, 2-story, \$400,000 building in Bel Air. Of light brick and blue ceramic tile, the clinic has 18,000 sq. ft. of floor

(Continued on page 32A)

Physicians in Indianapolis explain why they prescribe Serpasil® for hypertension



Physicians in Indianapolis, as all over the world, realize that Serpasil has two special advantages for many hypertensive patients:

1. **The Central Effect:** Serpasil calms those who are anxious or tense as well as hypertensive.
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These facts about Serpasil were found in reports from 450 physicians in the U.S. (part of a world-wide survey*): 74 per cent of *hyper-anxious* hypertensives treated with Serpasil

showed excellent or good over-all response; 80 per cent of patients with *tachycardia* showed excellent or good response.

When marked anxiety-tension or tachycardia are part of the hypertensive picture, Serpasil can help your patient in more ways than one.

DOSAGE: Average initial daily dose, 0.5 mg. with a range of 0.1 to 1 mg. Reduce in one week to 0.25 mg. or less daily for maintenance.

SUPPLIED: *Tablets*, 0.1 mg., 0.25 mg., 1 mg., 2 mg., and 4 mg. *Elixirs*, 0.2 mg. and 1 mg. per 4-ml. teaspoon. *Samples available on request.*

*Complete information from this survey will be sent on request. SERPASIL® (reserpine CIBA)

C I B A
SUMMIT, N. J.

NEWS BRIEFS

(Continued from page 30A)

space and 186 ft. of frontage. The laboratory, x-ray rooms, emergency surgery rooms, staff and employee lounge, business office, and central supply rooms are located on the first floor as well as a pharmacy. The second floor houses diagnostic facilities, doctors' examining rooms, and nurses' stations. A lift system will carry more than 30,000 medical records to the doctors' offices. A similar system transfers x-ray films to the second floor.

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THE ENTIRE UPPER FLOOR of the new 68 x 40 ft., split-level Wayzata Medical building is devoted to pediatrics. Adjoining this floor is an outdoor children's play area. Included in the pediatric portion of the building are the main waiting room, 4 examination rooms, an emergency room, a laboratory, a bookkeeping section, and private office. Drs. E. J. Huenekens, Robert D. Semsch, and Deane A. Petersen occupy the upper floor. Housed on the lower level is the dental section, including a waiting room, reception room, laboratory, a private office, and 2 operating rooms. Also on this level are a reception room, 4 examination rooms, a laboratory, an office, and an x-ray room that serves all departments. The lower level is occupied by Drs. R. Charles Baron, dentist; George O. Hilgermann, ophthalmologist; and F. J. McCaffrey, obstetrician and gynecologist.

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A \$10,000 BEQUEST in the will of the late Dr. H. F. Helmholz to the Mayo Association will provide an annual lectureship in child health and welfare. To be known as the Amberg-Helmholz lectureship, it will commemo-

rate the forty-six years that Dr. Helmholz and Dr. Amberg worked together in the field of pediatrics. Dr. Helmholz, who died in 1958, was head of the Section of Pediatrics at the Mayo Clinic for twenty-five years before his retirement in 1949. He won international recognition for his work in the field of child health and welfare. Dr. Amberg, an emeritus member of the clinic staff, retired in 1946. He has been recognized for his notable skill as a specialist in children's diseases.

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DR. LOUIS A. BUIE, emeritus head of the Section of Proctology at the Mayo Clinic, is 1 of 16 educational and medical leaders named to a new Committee on Professional Education to guide the expanded program of education of The National Foundation as it extends beyond polio into the fields of birth defects and arthritis.

• • • •

DR. W. H. BICKEL, head of a Section of Orthopedic Surgery in the Mayo Clinic and associate professor of orthopedic surgery in the Mayo Foundation, has been elected president of the American Board of Orthopedic Surgery, Inc. Dr. Bickel was also reappointed to represent the board on the Advisory Council for Medical Specialties and is chairman of the Residency Review Committee of the board.

• • • •

DR. C. WALTON LILLEHEI, University of Minnesota heart surgeon, recently received a scroll from the Johannesburg, South Africa, Memorable Order of Tin Hats (MOTH) for performing successful heart surgery on a 10-year-old Johannesburg girl. MOTH, a British combat (Continued on page 34A)



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NEWS BRIEFS

(Continued from page 32A)

veterans organization, sponsored the girl's trip to University hospitals. The award was made at the annual state Veterans of Foreign Wars dinner in Minneapolis.

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DR. HAROLD O. PERRY and DR. STANLEY A. LOVESTEDT, of the Mayo Clinic, received the first award for their exhibit "Lesions of the Oral Mucosa" presented at the annual midwinter clinical session of the Colorado State Medical Society in Denver in February. Dr. Perry is a consultant in dermatology at the Mayo Clinic and instructor of dermatology in the Mayo Foundation. Dr. Lovestedt is head of the Section of Dentistry at the Mayo Clinic and assistant professor of dentistry in the Mayo Foundation.

• • • •

DR. WAYNE C. RYDBURG has been elected president of the medical staff at Swedish Hospital in Minneapolis. Dr. Earl C. Henrikson was elected president-elect, and Robert E. Kasper is secretary-treasurer.

South Dakota

THE NEW, MODERN WILLOW LAKE CLINIC has been completed and is ready for service. The 36 x 44 ft. building houses 2 emergency rooms and a waiting room. It is now designed for 1 physician but could be rearranged to accommodate 2.

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DR. RICHARD B. LEANDER, formerly of Council Bluffs, Iowa, has established practice in psychiatry and neurology in Sioux Falls. A graduate of Creighton University in Omaha, Dr. Leander interned in Butte, Montana, and then entered the Navy in 1943. He is a diplomate of the Board of Psychiatry.

Deaths . . .

DR. G. DOUGLAS BRAND, 66 prominent St. Paul physician, died of a heart attack February 23 in New Britain, Connecticut. Dr. Brand and his wife were on their way to Europe for a two-months' vacation.

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DR. WILLIAM W. GRISE, 73, well-known Austin, Minnesota, physician died February 20. Although a general practitioner, Dr. Grise specialized in obstetrics. He was one of the founders of the Austin Clinic.

• • • •

DR. HARRY L. PARKER, 65, a member of the Mayo Clinic staff from 1925 to 1934 and from 1945 to 1959, died in Rochester March 1. Dr. Parker left Rochester for his native Ireland in 1934, where he practiced neurology and psychiatry in Dublin. In 1945, he returned to Rochester as consultant in neurology at the Mayo Clinic.

• • • •

DR. JACOB SHORT, 55, a St. Paul physician, died February 22 in Miami, Florida, where he had gone for a ten days' vacation. With the exception of a period spent in military service in World War II, Dr. Short had practiced in St. Paul since his graduation from the University of Minnesota Medical School in 1926.

COMING in *June* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- The June issue will be published in memory of the late Erling S. Platou, M.D., well-known Minneapolis pediatrician whose untimely death occurred June 17, 1958. The JOURNAL-LANCET is grateful to members of the Northwestern Pediatric Society for generously contributing the papers that will make this forthcoming memorial issue possible.

- Robert L. Vernier, M.D., Howard G. Worthen, M.D., and Robert A. Good, M.D., of the University of Minnesota, discuss "The Electron Microscope in Medical Research." The results of a series of studies of human and experimental nephrosis by means of light and electron microscopy are reviewed, which illustrate the value of this new morphologic technic in medical research.

- In the article "Intrahepatic Biliary Atresia," L. Jerome Krovetz, M.D., of the University of Minnesota, reviews the literature on this subject and includes reports of 2 such cases treated at the University of Minnesota hospitals. One of these patients is still living at 16 years of age and is reasonably well except for severe pruritus. No reports have ever been recorded of a patient with biliary atresia who survived for this length of time.

- The case report of a 10-year-old boy who died from renal failure is presented in the paper "Bilateral Renal Hypoplasia" by R. K. Slungaard, M.D., and J. L. Jaack, M.D., of LaCrosse, Wisconsin. At autopsy, extensive changes due to glomerulonephritis and decreased number of calyces and pyramids were found. The small kidneys were believed to be caused by glomerulonephritis occurring in hypoplastic kidneys. The case illustrates the difficulty that may be encountered in deciding which factor is the most important in determining the size of the kidneys.

- In the paper "Recurrent Retropharyngeal Abscess," Harold W. Hermann, M.D., Dean J. Hempel, M.D., and A. Cornell Erlanson, M.D., of Minneapolis, describe the case of a 5½-year-old boy with this relatively rare condition. The incidence and pathology of the disease are discussed as well as its diagnosis and treatment. The reader is warned of the complications that may develop if an abscess is not treated.

Meetings and Announcements

UNIVERSITY OF MINNESOTA MEDICAL CONTINUATION COURSES

May 11-15—Introduction to Electro-

cardiography for General Physicians

May 18-22—Proctology for General Physicians

May 27-29—Otolaryngology for Specialists

June 15-17—Gynecology for General Physicians

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

COURSE IN CHEST DISEASES


The Trudeau School of Tuberculosis and Other Pulmonary Diseases will hold its annual session at Saranac Lake, New York, June 8 to 26. The course provides outstanding instruction in the field of chest diseases. Tuition is \$100. A few scholarships are available. Address inquiries to the Secretary, Trudeau School of Tuberculosis and Other Pulmonary Diseases, Box 500, Saranac Lake, New York.

RUIDOSO SUMMER CLINICS

The New Mexico Academy of General Practice will hold its second Ruidoso Summer Clinics July 20 through 23 at Ruidoso, New Mexico. The course will be approved for about 14 hours of Category I credit. Activities of interest to the entire family are planned. For accommodations, write Dr. A. B. Alexander, Box 694, Ruidoso. Preregistration fee is \$20 and should be sent to Dr. F. R. Brown, 207 N. Union, Roswell, N. M. Registration at Ruidoso will be \$25.

POSTGRADUATE TOUR OF EUROPE

The International College of Surgeons will conduct a tour of Europe leaving New York July 17 on the S. S. Nieuw Amsterdam or by plane July 24. Participants will attend the Amsterdam meeting July 25 and 26 and the Helsinki meeting August 8 and 9 and spend August 11 through 13 in Leningrad, August 15 through 17 in Moscow, and August 19 and 20 in Vienna. For further information, write Dr. Ross T. McIntire, executive director, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, or International Travel Service, Inc., 119 S. State St., Chicago 3.



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Value of Cutaneous Biopsy in Internal Medicine

HAMILTON MONTGOMERY, M.D.

Rochester, Minnesota

A GREAT MANY DISORDERS of the skin are simply the cutaneous manifestations of systemic disease. In fact, this is true of the majority of dermatoses if the superficial pyodermas are excluded, including impetigo and acne; the common dermatoses, such as psoriasis and lichen planus; superficial fungous disturbances; and those cutaneous affections due to most of the animal parasites. This paper is not concerned with primary cutaneous malignant tumors.

METASTATIC LESIONS

Metastatic malignant tumors in the skin occur rather frequently in all types of malignant internal neoplasms. The sudden appearance of a few or many firm nodules, especially in the scalp, leads one to suspect the presence of a metastatic neoplasm, especially metastatic carcinoma from the breast or gastrointestinal tract. Confirmation of such a diagnosis by cutaneous biopsy can avoid unnecessary exploratory operative procedures. Melanomas of the eye may metastasize to the skin as amelanotic subcutaneous nodules. As a rule, the epidermis is uninvolved in these metastatic tumors, which helps to distinguish them from primary cutaneous neoplasms. As Kierland and I¹ pointed out some years ago, diagnosis sometimes may be accomplished by cutaneous biopsy before there is a

clinical history or evidence of the underlying internal tumor.

The lymphoblastomas or malignant lymphomas often give rise to secondary metastatic nodules in the skin or to generalized erythroderma. In the latter instance, histopathologic studies will distinguish between exfoliative dermatitis or generalized erythroderma due to benign dermatoses and that caused by the leukemias, Hodgkin's disease, and reticulum cell sarcoma.

LUPUS ERYTHEMATOSUS

Lupus erythematosus (L.E.) may occur as a localized chronic discoid variety limited to the skin, or it may progress into a systemic form with serious implications and often fatal termination. Application of the L.E. test and acquisition of knowledge concerning the L.E. phenomenon indicate that about a third or more of cases of systemic L.E. are not accompanied by cutaneous manifestations or include, at most, a transitory erythema lasting a few days or weeks. On the other hand, many patients with systemic L.E. have cutaneous lesions that display a rather characteristic histologic picture. Distinction between L.E. and light-sensitive or solar dermatitis also may be made histopathologically, although, at times, only with considerable difficulty. The histopathologic changes in the skin in L.E., dermatomyositis, and various types of scleroderma are completely different from each other. Biopsy of muscle is of distinct value in distinguishing between certain cases of sclero-

HAMILTON MONTGOMERY is affiliated with the Section of Dermatology at the Mayo Clinic and is professor of dermatology in the Mayo Foundation.

derma and dermatomyositis. Cutaneous biopsy in L.E. is of value in distinguishing it from atrophic forms of lichen planus, which is an entirely benign condition. Establishment of the diagnosis of urticaria pigmentosa by cutaneous biopsy may lead to further studies, including roentgenograms of bones and search for involvement of the liver or spleen. In other words, some cases of urticaria pigmentosa are associated with a mastocytoma.

METABOLIC DISEASES

In regard to metabolic disturbances, various types of xanthoma, especially xanthoma tuberosum, are readily diagnosed by cutaneous biopsy. It is well known that a high incidence of angina pectoris and arteriosclerosis obliterans is associated with this condition. Both localized and generalized forms of amyloidosis may be encountered. Sections stained with methyl violet will demonstrate the presence of amyloid and establish the diagnosis when systemic involvement is present, thus leading to study of the bone marrow and other procedures as indicated. Localized or generalized calcinosis often has cutaneous manifestations no matter what the underlying cause may be. Necrobiosis lipoidica diabetiformis may be diagnosed by cutaneous biopsy.

MISCELLANEOUS CONDITIONS

The diagnosis of various types of vascular diseases of the extremities, ranging from thromboangiitis obliterans to simple stasis ulcers, may be confirmed by histopathologic studies. I have seen rare instances of periarteritis nodosa limited to the skin and running a benign course, but the histologic changes in the skin are the same as those in the internal organs. A definite diagnosis of the ordinary forms of periarteritis nodosa can be confirmed or established by cutaneous biopsy.

Erythema nodosum, in this country at least, usually is not regarded as being associated with or due to tuberculosis, but it often accompanies various rheumatoid states.

Histiocytosis X, which includes eosinophilic granuloma of the bone, Hand-Schüller-Christian disease, and Letterer-Siwe disease, frequently exhibits cutaneous manifestations, including pectchie and seborrhealike plaques. The diagno-

sis can be established or confirmed by cutaneous biopsy. In some instances of histiocytosis X, the condition apparently remains confined to the skin without involvement of systemic organs.

Pigmentary disturbances of the skin may be localized or systemic, and they may be associated with certain systemic syndromes. Biopsy readily establishes the diagnosis of argyria and hemochromatosis, the latter through the demonstration of hemosiderin. Special stains allow distinction to be made between the melanotic pigmentation seen in Addison's disease and the deposition of hemosiderin in hemochromatosis. Adult forms of acanthosis nigricans have a distinctive histologic picture and almost always are associated with an underlying malignant neoplasm. Pseudoxanthoma elasticum is associated not only with angiod streaks of the retina but also with various systemic disturbances in other organs. The deep fungous infections, such as blastomycosis, present rather characteristic histopathologic changes, including demonstration of the causative organisms with ordinary stains and by special techniques, such as the periodic acid-Schiff method. However, the diagnosis must be confirmed by cultural studies.

CONCLUSIONS

Whereas some of the conditions already mentioned have a diagnostic clinical appearance, the cutaneous lesions in many diseases may simulate various dermatoses that do not have systemic implications. Furthermore, with regard to metastatic malignant tumors in the skin, clinical examination will not specify the origin of metastasis nor indicate whether one is dealing with a metastatic carcinoma, melanoma, or lymphoblastoma. Resort to cutaneous biopsy is necessary to settle these questions.

Cutaneous biopsy is a relatively simple office procedure. It may save the patient an unnecessary exploratory operation, or it may lead to further laboratory studies and other tests in search of an underlying systemic disease, symptoms of which may not have, as yet, become clearly manifest.

REFERENCE

1. MONTGOMERY, H., and KIERLAND, R. R.: Metastasis of carcinoma to the scalp: distinction from cylindroma and from carcinoma of the dermal appendages. *Arch. Surg.* 40:672, 1940.

Conservative Management of Endometriosis

ROBERT W. KISTNER, M.D.

Brookline, Massachusetts

ENDOMETRIOSIS was described as an entity over a century ago but continues as an unsolved, enigmatic disease. Although it has been called a "disease of theories," it is quite real to those affected and frequently results in recurrent pelvic pain, dyspareunia, irregular bleeding, and infertility. The crippling characteristics of this malady, occurring during the reproductive period, prevent fulfillment of marital potential and have forced surgeons to perform hysterectomy or castration in order to secure relief.

Unfortunately, endometriosis seems to be occurring with increasing frequency during recent years. At the Sloane Hospital in metropolitan New York City, it was found in almost 8 per cent of 8,000 laparotomies during the 1932-1949 interval, whereas at the Kings County Hospital in Brooklyn, across the East river, the disease is a rarity. This may be explained on the difference in socio-economic levels of the two groups, since, in the Sloane report, a good number of private patients were included, but only service patients, who are largely Negro, are cared for at Kings County Hospital. The incidence of leiomyoma and pelvic inflammatory disease at the latter institution, however, is very high. At the Free Hospital for Women in Brookline, Massachusetts, endometriosis has been found in 18 per cent of laparotomies performed during the last five years and is diagnosed microscopically in about one-third of operations done for "infertility."

During the last five years, over 300 articles have been published on the subject of endometriosis, the large majority dealing with histogenesis, diagnosis, and management. Despite the extensiveness of these reports, unanimity of opinion has not been expressed in regard to any of these facets. The purpose of this paper is to review briefly the available data and to suggest conservative therapeutic measures, so that the childbearing potential may be preserved and possibly increased.

ROBERT W. KISTNER is associate in gynecology at Harvard Medical School, Boston, and is associate surgeon at the Free Hospital for Women, Brookline.

HISTOGENESIS

Endometriosis may be defined as the proliferating growth and *function* of endometrial tissue in areas other than the uterus but usually involving the ovaries, posterior cul-de-sac, uterosacral ligaments, and serosa of the rectosigmoid. Adenomyosis, or internal endometriosis, refers to a process of invasion and growth of uterine mucosa into the myometrium and differs in that it is usually found in multiparous women in an older age group. Since conservative management of this disease is rarely possible, it will not be discussed further. Chocolate cysts are usually blood-filled endometrial ovarian cysts, termed endometriomas, and are due to recurrent menstrual bleeding into a closed space. It should be remembered, however, that all blood or chocolate-syrup filled cysts are not due to endometriosis, since a corpus luteum hematoma may give a similar appearance. Even in bona fide endometriomas, the diagnosis may be difficult, since endometrial glands and stroma may have become compressed by the blood, and the pathologist is reticent to make the diagnosis. If the endometriosis is not completely "burned-out," close scrutiny of the wall will reveal numerous hemosiderin-laden macrophages, lymphocytes, and patches of condensed endometrial stroma without glands.

The most popular theory of histogenesis is that of Sampson, who stated that viable fragments of endometrium are regurgitated with menstrual blood in a retrograde fashion through the oviducts with subsequent implantation on the ovaries or into the posterior cul-de-sac. Adequate evidence has now been accumulated to prove that at least some of the desquamated endometrium is viable and capable of growth.

A second theory of histogenesis is that of the German pathologist, Robert Meyer, and championed by many other investigators, including Dr. Arthur T. Hertig of Harvard. This theory suggests that the coelomic epithelium covering the ovaries and pelvic peritoneum has totipotent qualities and is stimulated by recurrent menstrual insults (blood and detritus) to undergo metaplasia into functioning endometrium.

Areas of endometriosis have been noted in the pelvic lymph nodes, pleura, lung, arm, thigh, and other areas which would be difficult to explain by Sampson's or Meyer's theory. Halban suggested that all heterotopic areas of endometriosis, wherever found, were metastatic growths originating in the endometrium and reached their destination via lymphatics. One may conclude that several avenues are available for the development and dissemination of this disease.

This brief summary of histogenesis is believed important to an understanding of the symptomatology and treatment of the disease because of the following observations:

1. Endometriosis occurs only in women who have ovulated and menstruated and is of no importance, except as the disease is related to ovarian cancer, after the menopause.

2. It is rarely, if ever, seen in women who have anovulatory cycles but is common in those who have uninterrupted cyclic menstruation for more than five years.

3. Endometriosis improves subjectively and objectively during pregnancy as well as during periods of hormonally induced anovulation.

4. Numerous pregnancies, if started early in menstrual life, seem to prevent development of the disease.

5. It is commonly associated with infertility, but it is not known whether endometriosis occurs because pregnancy is deferred or whether sterility is the eventual result of disseminated endometriosis. A combination of factors may be etiologic.

INCIDENCE

An increasing frequency in the occurrence of endometriosis has been noted in recent years, and various reports have indicated that the disease is found in between 8 to 18 per cent of pelvic operations. It is not found commonly in the colored race and seems to occur in women who are in a higher socio-economic bracket. As such, it has been correlated with delayed or deferred motherhood. The median age of patients with endometriosis is about 37 years, but approximately 15 per cent are less than 30. It has been suggested that a certain body type and psychic demeanor are found associated with endometriosis. Characteristically, the patient is mesomorphic but underweight, overanxious, intelligent, and egocentric and tends to be a perfectionist. These characteristics represent a personality pattern in which marriage and child-bearing are likely to be deferred and, therefore, predisposing to prolonged periods of uninterrupted ovulation.

PATHOLOGY

Typical microscopic sections of areas of functioning endometriosis show: (1) endometrial glands and supportive stroma, (2) erythrocytes, (3) hemosiderin-laden macrophages, and (4) fibrous connective tissue and inflammatory cells. It is important to remember that the functional or bleeding element is the stroma, not the glands. Therefore, so-called stromatous endometriosis represents this disease process whether or not glands are present. Endometriosis spreads in a cancer-like fashion and may produce ovarian destruction, oviduct deformity, bladder dysfunction, large bowel obstruction, and ureteral constriction. The cause of infertility has not been proved, but is believed to be due to an inadequacy of tubo-ovarian motility secondary to adhesions and fibrosis. The fimbriated portions of the oviduct are almost always patent, and endometrial biopsies reveal normal secretory endometrium.

SYMPTOMS

In most patients, one or more of the following symptoms are noted: (1) progressive, acquired, severe pelvic pain associated with, or occurring just prior to, menstruation; (2) dyspareunia; (3) painful defecation, especially during menstrual periods; (4) premenstrual staining or hypermenorrhea; (5) urinary frequency or hematuria occurring cyclically in relation to menstruation; and (6) infertility.

Some patients state that they "always" had painful periods but that the pain recently increased in severity. The cause of the pain has never been adequately explained but is probably related to bleeding as a result of "miniature menstruation" in encapsulated or fibrotic areas with distention of overlying peritoneum.

All patients with endometriosis do not complain of pain and it is found rather unexpectedly at the time of laparotomy for fibroids, abnormal bleeding, or unexplained infertility. Bilateral large ovarian endometriomas may remain silent until the time of sudden rupture, when the signs and symptoms of an acute abdominal emergency become apparent. The surgeon is frequently amazed at the small amount of endometriosis found in patients who complain bitterly of incapacitating pelvic pain. Often, there is merely puckering and scarring of the posterior cul-de-sac, with the rectosigmoid being incorporated in this process. Since the etiologic factors causing pain are unknown, one is forced to admit that the amount of *evident* endometriosis bears no relationship to the degree of subjective discomfort.

Dyspareunia is a common complaint and is probably related to the presence of active disease in the posterior cul-de-sac with a fixed third-degree retroversion. Painful defecation may be caused by menstrual bleeding into the muscularis of the rectosigmoid with the subsequent development of adhesions. Premenstrual staining and hypermenorrhea should be noted as being *associated with* endometriosis in a large percentage of cases but not necessarily *due to* the disease. In about 10 to 15 per cent of patients, the abnormal bleeding is probably due to derangement in corpus luteum function following changes produced by the disease itself.

Urinary frequency, dysuria, and hematuria at the time of the period, as well as suprapubic "bearing down" pain, may be caused by extension of the endometriosis into the wall of the urinary bladder. Abdominal and flank pain may be caused by partial obstruction of the ureter usually in an area adjacent to the uterosacral ligaments.

When laparotomy is performed for the primary indication of infertility, endometriosis is found in about one-third of all patients. If studies in an infertility patient show regular ovulation, patent fallopian tubes, and an adequate sperm analysis, endometriosis should be strongly suspected.

DIAGNOSIS

The diagnosis may be suspected by the history, corroborated by pelvic examination, and verified by culdoscopy, biopsy, and laparotomy. A history of acquired dysmenorrhea of increasing intensity in the absence of pelvic infection and associated with dyspareunia and infertility is usually due to endometriosis. Pelvic examination is almost pathognomonic if tender, nodular uterosacral ligaments are discovered in conjunction with a fixed, third-degree uterine retroversion. Biopsy of suspicious areas in the vagina, perineum, umbilicus, or cervix prove the etiology, and similar lesions of the cul-de-sac may be approached by culdoscopy or posterior colpotomy if the rectum is not too adherent. It should be recalled that small areas of suspicious endometriosis removed at laparotomy may show only stroma with hemorrhage and reaction to blood pigments. This finding should be sufficient for diagnosis in most cases, but, to aid the pathologist, tiny blue spots or "powder-burns" should be tagged with a suture for easy identification.

TREATMENT

Treatment will be discussed under four headings: (1) observation and analgesia, (2) sup-

pression of ovulation, (3) conservative surgery, and (4) extirpative surgery and radiation.

Observation and analgesia. In the patient who presents only minimal symptoms and pelvic findings, such as slight tenderness and nodularity of the cul-de-sac, expectant treatment is worthwhile. Reassurance and mild analgesics are adequate in most patients. If the patient is married, early pregnancy is suggested, and advice is given to have subsequent pregnancies as quickly as is economically sound. Should increased or irregular bleeding occur, a careful examination under anesthesia and thorough curettage is performed. Regular pelvic examinations should be scheduled at least every six months if endometriosis is suspected, and, although the incidence of malignancy arising in endometriosis is low, rapid growth and development of large endometriotic cysts may occur in a short period of time. At the time of pelvic examination, the ovaries should be carefully palpated and changes in size and mobility noted. Progression of disease is suggested by obliteration of the cul-de-sac or the development of rectovaginal masses and necessitates specific therapy. If the patient is infertile, an adequate study of the husband together with endometrial biopsy, tubal insufflation, and postcoital tests should be performed. If pregnancy does not occur after one year of study, observation, and planned coitus, other methods are indicated (*vide infra*).

Observation as a form of treatment is often rewarding, since many patients either "outgrow" their endometriosis or become pregnant and are asymptomatic indefinitely.

Suppression of ovulation. Pregnancy has often been suggested as the optimum prophylactic and therapeutic treatment for endometriosis, since symptoms and signs regress during the period of gestation and for varying periods of time thereafter. This is probably due to a combination of anovulation and amenorrhea brought about by adeno-hypophyseal suppression. The author has suggested that the improvement may also be due, in part, to a transformation of functioning endometriotic tissue into decidua by the increasing levels of estrogen and progesterone secreted by the placenta. If pregnancy is not contemplated or is undesired, it is possible to secure anovulation by the administration of estrogens, androgens, progestins, or a combination thereof. The following schemes have proved successful in our hands:

1. Estrogens—1 mg. of diethylstilbestrol is given on the first day of the menses and increased by 1 mg. every three days to a total of 5.0 mg. daily. Then 25 mg. tablets are ordered

and increased by one-fourth tablet (6.25 mg.) every three days to a total daily dosage of 100 mg. This dosage is continued for three months daily. The dose is then decreased by one-fourth tablet daily until the last dose is taken.

Estrogens are effective by producing (a) an-ovulation, (b) amenorrhea, and (c) softening of the entire genital tract and possibly the areas of endometriosis. Karnaky believes that a state of "exhaustion atrophy" is produced in the endometriosis. The side effects of therapy are (a) early nausea, (b) breast soreness, (c) vaginal discharge, and (d) occasional "breakthrough" bleeding due to endometrial hyperplasia.

2. Androgens—10 mg. of methyltestosterone is given daily, orally for two menstrual cycles and then omitted for one cycle. An alternate method is to administer 5 mg. of Oreton daily, sublingually for one hundred consecutive days. In the foregoing dosages, ovulation is not inhibited, since menstrual periods occur and pregnancy has been reported. Higher dosages inhibit ovulation and cause involution and suppression of follicular growth, but amounts exceeding 300 mg. monthly frequently cause masculinizing symptoms. In lower doses, the effects are presumed to be due to direct action of the androgens on areas of endometriosis.

Side effects, especially in sensitive individuals, include acne, voice hoarseness, edema, hirsutism, clitoral enlargement, and, occasionally, hepato-cellular jaundice.

3. Progestins—the optimum method of inducing pseudopregnancy at present is to give 10 mg. of Enovid (17 α -ethynyl-17-hydroxy-5 (10)-estren-3-one with 1.5 per cent 3-methyl ether of ethynylestradiol) daily for two weeks, starting on the fourth or fifth day of the menstrual period and increasing 10 mg. every two weeks until 40 mg. is given. Enovid is a potent, orally effective progestin. The addition of 3-methyl ether of ethynylestradiol prevents "breakthrough" bleeding and provides an ideal method of mimicking the hormonal changes of pregnancy. Enovid inhibits ovulation, induces a secretory endometrium, and produces a decidual effect in areas of endometriosis. It is postulated that, after five to six months of such treatment, decidual necrosis occurs which is followed by gradual absorption.

Certain side effects, due to the estrogen content of Enovid, may be expected during the early part of treatment. These include nausea, vomiting, and breast soreness. Nausea may be diminished by: (a) starting with 5 mg. instead of 10 mg., (b) giving the medication with the evening meal, (c) adding milk or an antacid and

taking Enovid just before retiring, or (d) using an antiemetic. Usually, the nausea moderates and disappears after four or five days and is ordinarily followed by an increased appetite, sense of well-being, and weight gain. Some increased weight may be due to a protein anabolic effect and some to sodium and water retention. The latter is improved by a low-sodium diet and chlorothiazide.

This therapy should be continued for a minimum of five to six months if the pseudopregnancy is being effected to avoid surgery. Ovulation is inhibited, and menstruation does not occur. After three to four months, softening of the firm cul-de-sac masses is noticed and dyspareunia is improved. Some patients have "breakthrough" bleeding on 40 mg. of Enovid daily. If this occurs, the dose may be increased to 50, 60, or 70 mg. When therapy is completed, the drug should be acutely discontinued. A withdrawal flow occurs in about four to six days and an ovulatory menstrual period in about six weeks. The patient is then exhorted to become pregnant, if this is feasible, within the first three or four months after stopping Enovid.

Other indications for Enovid therapy in endometriosis include: (a) treatment for recurrences after previous conservative surgery, (b) prophylactic treatment immediately following conservative surgery to place the ovaries and any residual endometriotic areas in a state of quiescence, (c) treatment of vaginal endometriosis, and (d) treatment immediately prior to surgery whether it be conservative or radical. In regard to the last indication, it has been found that a three to four weeks' course of pseudopregnancy prior to surgery produces softening in areas of densely scarred endometriosis and simplifies the dissection necessary in this disease.

Conservative surgery. If childbearing function is to be preserved, surgery should be as conservative as possible. It has been our policy to resect ovarian endometriosis and either fulgurate or resect areas in the cul-de-sac. Peritubal and periovarian adhesions are freed, and the uterus is suspended. The fimbriated portions of the oviduct are brought into proximity with the ovaries, and all raw areas are peritonized if possible. If pain has been troublesome, a presacral neurectomy and uterosacral denervation are performed. The infundibulopelvic nerve supply has not been interrupted. Areas of endometriosis involving the sigmoid colon or bladder flap are excised. Pregnancies have been reported after leaving only a remnant of ovary and one functioning oviduct, so that the surgeon should be optimistic. About 30 per cent of women so treated become preg-

nant if no other cause for infertility exists. As previously mentioned, pseudopregnancy is induced for a minimum of three months after surgery, following which concerted efforts toward conception are made.

Radical treatment. The treatment of choice for extensive endometriosis is total hysterectomy and bilateral salpingo-oophorectomy in women who are no longer desirous of pregnancy. It has not seemed reasonable to us to leave the ovaries in situ if the uterus is removed for this disease, since ovulation is known to continue, and remaining areas of endometriosis may be stimulated by cyclic estrogen-progesterone secretion. This must be differentiated from *constant* estrogen-progesterone therapy as indicated in the paragraph on therapy. In experimental endometriosis in monkeys, it has been shown that the most extensive growth was obtained by the cyclic administration and *withdrawal* of estrogen and progesterone. This is exactly the situation that exists when functioning, ovulating ovaries are left in situ.

There is no contraindication to the use of continuous estrogen in small doses following ablative surgery as previously described. We have used 0.05 mg. of Estinyl or 0.5 mg. of diethylstilbestrol daily for indefinite periods of time to control untoward symptoms after surgical castration. These drugs may gradually be diminished both in amount and frequency of administration over a period of years.

The use of x-ray or radium for nonmalignant pelvic conditions, including castration for endometriosis, has been practically eliminated in our clinic. Besides the possibility of subsequent carcinoma of the cervix, endometrium, or ovary, serious large and small bowel injuries may occur as late sequelae.

SUMMARY AND CONCLUSIONS

1. Endometriosis is a benign disease with certain malignant characteristics. It is increasing in incidence and, if untreated, may result in ovarian destruction, deformity of the oviduct, bowel obstruction, and ureteral fibrosis.

2. A predisposing cause seems to be uninterrupted periods of ovulation exceeding five years. It is more common in patients of the higher socio-economic group in whom childbearing has been delayed or deferred, and it is found in about one-third of all patients who are classified as infertile.

3. The disease improves subjectively and objectively during pregnancy.

4. Palliative therapy includes observation and analgesia, hormonally induced anovulation, or a combination of conservative surgery and anovulation.

5. Anovulation may be induced with estrogens, androgens, or progestins.

6. Pelvic examination should be performed at regular intervals of not more than six months to make certain that dissemination of the disease is not occurring.

7. A "pseudopregnancy," using progestins and estrogen, may be utilized to: (a) avoid or delay surgery, (b) treat recurrent endometriosis after conservative surgery, (c) prevent recurrence after conservative surgery, (d) treat vaginal endometriosis, and (e) simplify the technic of conservative surgery if utilized preoperatively.

8. The disease process may be cured by removing the source of cyclic estrogen-progesterone secretion, that is, by castration. This is best accomplished by total hysterectomy and bilateral salpingo-oophorectomy.

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The Crush Syndrome

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ACU TE RENAL FAILURE secondary to extensive crushing injuries has been referred to as the "crush syndrome." If unrecognized and untreated, this failure of renal function may be fatal. Renal shutdown may be secondary to myoglobinemia, prolonged hypotension, transfusion with incompatible blood, or a combination of these factors. Typically, the urine is red or brown for twenty-four hours, after which oliguria or anuria develops. The renal lesion is secondary to vasoconstriction of the renal arteries, causing cortical ischemia, anoxia, and interstitial edema. In the presence of acid urine, myoglobin precipitates in the tubules. Diuresis follows reabsorption of the interstitial edema and reopening of the tubules. Therapy is predicated on the fact that most of these lesions are self-limiting and reversible, and, in one to two weeks, renal function returns. Conservative management during this critical period of oliguria or anuria entails attention to a number of details.

Of prime importance is early diagnosis. Fluid intake and output should be recorded accurately from the time of injury. If the patient is unable to void, the bladder must be catheterized. If the urine output remains unsatisfactory in the presence of proper hydration and normal hemodynamics, obstruction of the upper urinary tract must be considered. Kidney, ureter, and bladder roentgenograms will reveal any evidence of calculous disease. Cystoscopic examination and bilateral ureteral catheterization should be done next to insure the patency of the urinary tract from kidneys to bladder. If no source of obstruction is found, the ureteral catheters should be removed and a program outlined for the management of anuria.

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TREATMENT

A number of procedures and medications, including spinal anesthesia, renal decapsulation, intravenous procaine, and ACTH or cortisone, have been recommended to modify the renal lesion of acute renal failure. No uniform success has been obtained with the foregoing measures, and they are now generally abandoned.

Isolation technic is indicated, as these patients are peculiarly susceptible to infection and may succumb to overwhelming bacterial invasion. Infection, especially pulmonary, is probably the most important complicating factor causing death in the anuric patient during both the anuric and diuretic phases. The virtue of prophylactic antibiotics is questionable, especially in view of the common occurrence of antibiotic-resistant organisms in patients so treated. However, there should be no hesitation in using antibiotics when established indications exist. Nephrotoxic drugs and drugs excreted by the kidneys should not be used. When possible, ambulation or active and passive motion in bed is of value in preventing pulmonary atelectasis, venous stasis thrombosis, and hypostatic pneumonia. In addition, the rate of protein catabolism, which is ordinarily increased even in the normal person at prolonged bed rest, may be decreased somewhat by activity.

Strict regulation of fluid intake is mandatory, since overhydration is one of the most common complications in these patients. As mentioned previously, an accurate record of all fluid intake and all measurable losses is necessary. Measured fluid losses should be replaced volume for volume unless obvious overhydration already exists, in which case intake may even be less than output for a period of time. Insensible fluid loss is very difficult to estimate accurately and the calculation of preformed water of oxidation prac-

tically impossible. With these two unknowns, fluid therapy would be very inaccurate were it not for the simple procedure of recording body weights daily or twice daily. It is virtually impossible for these seriously ill patients to restore body tissues at the same rate they are destroyed, and any patient who gains weight or fails to lose weight must be doing so at the expense of overhydration. It is, therefore, wise to insist on a daily weight loss of one-half to three-quarters of a pound. It is well to err on the side of too little rather than too much fluid, as deficiencies are easily replaced, whereas excesses may require drastic measures for elimination. The moderately-dehydrated anuric patient does better than the well-hydrated patient. No attempt should be made to initiate diuresis with diuretics or by forcing fluids, as urine flow resumes when renal edema subsides and tubules reopen.

A serious consequence of renal failure is the accumulation of the products of protein catabolism, such as the hydrogen ion, phosphates, sulfates, uric acid, potassium, magnesium, and nonprotein nitrogen. Prompt and adequate care of the primary injury with debridement, evacuation of blood clots, prevention of infection, or amputation of severely crushed extremities is of paramount importance in this regard. Protein-sparing calories should be supplied in the form of sugar and fat by mouth if tolerated. Frozen butter balls, popsicles, concentrated sugar water, and Lipomul are generally administered. Unfortunately, nausea and vomiting usually prohibit oral feeding, and the parenteral route must then be used. Since calories must ordinarily be supplied with a limited amount of fluid, concentrated solutions, such as 50 per cent dextrose in water, are given intravenously. Because these concentrated solutions are sclerosing to smaller veins, plastic tubing should be threaded into a large vein and a slow, continuous twenty-four-hour infusion utilized to supply the necessary daily fluid and nutrients. Vitamins may also be administered by this route. Testosterone has an anabolic effect and may have some protein-sparing action. It is administered as testosterone propionate, 25 mg. daily.

ELECTROLYTE ABNORMALITIES

Electrolyte aberrations develop in the anuric patient and constitute serious difficulties in management. The release of intracellular potassium from traumatized and infected tissues and hematomas may result in a rapidly fatal hyperkalemia if unrecognized and untreated. Signs and symptoms of hyperkalemia include decreased tendon reflexes, paresthesia, numbness, paralysis, cardiac

arrhythmias, and typical electrocardiographic changes. Although highly lethal, hyperkalemia itself should not be a cause of death in the patient with acute renal failure, as several effective methods of prevention and treatment are available. Prophylaxis primarily involves those measures previously mentioned to decrease protein breakdown. Should toxic levels of serum potassium develop, active treatment is necessary. Intravenous glucose and insulin (1 unit of insulin per 3 gm. of glucose) temporarily lower serum potassium by carrying it to the liver as the glucose is deposited as glycogen. Acute hyperkalemia may also be treated with a continuous infusion of 10 per cent calcium gluconate. These methods are purely temporary in nature, and, once toxic symptoms of hyperkalemia develop, more definitive measures must be instituted. A simple method of removing body potassium is by catharsis with magnesium or sodium sulfate. However, care must be exercised to avoid magnesium intoxication, since a small portion of orally administered magnesium is absorbed from the bowel. Depletion of other electrolytes caused by the diarrhea must also be avoided by proper replacement. Gastric and intestinal lavage accomplish essentially the same end as catharsis but are generally unsatisfactory. Ion exchange resins such as hydrogen, ammonia, or sodium-loaded, are often very effective in removing potassium from the body. They may be administered orally as a 15 to 20 per cent or rectally as a 25 to 30 per cent suspension in water. Again, care must be exercised to avoid acidosis, ammonia intoxication, or overloading the patient with sodium. Serial electrocardiograms are very useful in following the net effect of changes in a number of serum ions, including potassium, sodium, calcium, and magnesium, on cardiac function and should be used routinely. Pronounced abnormalities in the electrocardiogram may reflect a failure of conservative therapy and indicate a need for some type of artificial dialysis.

Nearly all anuric patients develop hyponatremia, even without evidence of sodium loss. This lowered serum sodium may result from the administration of excess salt-free fluids or the production of endogenous water of oxidation. In addition, a deficiency probably develops in the mechanism which normally establishes the gradient between intra- and extracellular sodium and potassium, thereby allowing potassium to move from the cells to extracellular fluid and sodium in the opposite direction. If this movement continues over a long period of time, the typical chemical pattern of hyperkalemia and

hyponatremia results. In general, it is unwise to treat serum sodium levels except to replace measured losses. There is a very real danger of overloading the vascular compartment by the administration of sodium to correct a serum level which reflects primarily dilution and/or electrolyte shifts. Serum chloride levels usually follow changes in sodium and should be regarded in the same manner.

Another typical electrolyte abnormality in the anuric patient is elevation of serum phosphorus and depression of serum calcium. As body tissue is catabolized, intracellular phosphate is released into the extracellular space, and, by some unknown mechanism, the body "attempts" to maintain a constant concentration product of calcium and phosphorus by lowering serum calcium, presumably by secretion into the bowel. The lowered calcium levels cause increased irritability of all types of muscle and nerve cells with secondary tetany and cardiac arrhythmias. Treatment is again directed toward sparing protein breakdown and the elimination of phosphorus-containing foods or fluids. Temporary relief of hypocalcemia is afforded by continuous intravenous infusion of 10 per cent calcium gluconate.

Normochromic and normocytic anemia secondary to increased hemolysis and decreased erythropoiesis routinely develops in the anuric patient. This anemia is usually well tolerated and stabilizes at some low level. The only effective treatment is transfusion, and, even then, the response is transient, as the transfused cells are rapidly hemolyzed and the hemoglobin level soon falls to pretransfusion levels. If transfusion does become necessary, fresh, packed, red blood cells are administered.

Tetany and/or convulsions may appear due to hypocalcemia, as discussed previously, and hypertension, overhydration, and altered central nervous system metabolism. Treatment is primarily prophylactic. Specific antidotes include calcium gluconate for hypocalcemic tetany and short-acting barbiturates, magnesium sulfate, paraldehyde, or Dilantin for convulsions. Magnesium sulfate, although very effective, must be administered with caution because magnesium is excreted by the kidneys, and toxic levels may develop if used indiscriminately and if anuria is prolonged. Long-acting barbiturates are also excreted by the kidneys and, therefore, should not be used.

Heart failure and pulmonary edema are also threats to the anuric patient. Studious restriction of fluids, as reflected in daily weight loss, is the best prophylaxis. Acute episodes are treated with bed blocks, tourniquets, and phlebotomy.

Digitalis is the drug of choice, and, if necessary, a short-acting preparation should be used. Prophylactic digitalization without evidence of impending failure is probably not indicated for a number of reasons. Generally, these patients respond poorly to digitalis, and it is difficult to determine the proper digitalizing dose. In addition, marked aberrations in serum electrolytes, especially potassium, sodium, magnesium, and calcium, make digitalization hazardous. Serious digitalis intoxication may develop in the patient digitalized during a period of electrolyte imbalance when this imbalance is rapidly restored toward normal. Deaths due to digitalis intoxication during dialysis with the artificial kidney have been ascribed to this mechanism.

Important functions of the kidneys are conservation of "base" and excretion of the hydrogen ion. It is, therefore, not surprising to note a tendency toward acidosis in the absence of renal function. This tendency is compensated for by the pulmonary mechanism of acid-base balance and is reflected in a lowered carbon dioxide level. It should be remembered that this is a compensatory mechanism, and, therefore, a lowered carbon dioxide level does not itself require treatment. Only actual changes in blood pH, reflecting a failure of the pulmonary mechanism, require alkali therapy. The administration of alkaline solutions, such as sodium bicarbonate or sodium lactate, must be done with care because of the danger of precipitating tetany in the patient with a lowered serum calcium, since the effective, or ionized, portion of serum calcium decreases as blood pH moves in the direction of alkalinity. For this reason, calcium gluconate should always be immediately available during alkali therapy in the patient with a depressed serum calcium level. Furthermore, unless acidosis is primarily secondary to sodium loss, some form of dialysis is probably the most physiologic means of restoring blood pH to normal.

DIURETIC STAGE

The period of diuresis which follows acute renal failure may be of sudden onset with massive volumes of urine output or, more likely, very gradual. In any case, there may be a tendency to relax vigilance under the false assumption that all is well after urine begins to flow. The fact that a high percentage of deaths occur during the diuretic stage due to the complications which have arisen earlier in the course of the disease or from improper management during diuresis emphasizes the importance of this phase. Continued care to prevent complications, especially infection, is

mandatory. Fluid and electrolyte replacement must be judicious. The oral route should be resumed as early as feasible. If overhydration is present at the onset of diuresis, urine output should exceed fluid intake until edema fluid is eliminated. Beyond this point, fluid replacement should lag output by twelve to twenty-four hours. There is no particular virtue in tremendous urinary output, and no attempt should be made to force fluids to this end. The clinical state of hydration is the best guiding factor. During diuresis, large quantities of sodium and/or potassium may be lost in the urine and require replacement. Serial electrocardiograms along with serum and urine electrolyte studies are helpful in this regard. Renal function usually returns rapidly after diuresis begins, and a general diet should be resumed as soon as possible. The blood urea nitrogen generally

continues to rise even after the return of renal function and may remain elevated for a prolonged period of time before returning slowly to normal levels. Little clinical significance need be attached to this phenomenon.

SUMMARY

Conservative therapy may be expected to suffice in many cases of anuria or oliguria secondary to crushing injuries. In instances of massive injury with rapid and prolonged tissue breakdown and in patients with prolonged anuria, the abnormalities discussed may not be amenable to such management, and some type of artificial dialysis will become necessary. Currently, the artificial kidney is the most effective method of dialysis available and may be used to sustain these patients over long periods until renal function returns.

IN YOUNG ADULTS, an acutely compressed vertebral body treated by immediate progressive mobilization reduces the period of hospitalization and produces excellent functional results. Long-term observations indicate that anatomic reduction of the fracture and continuous immobilization are unnecessary.

Initial measures are aimed at immediate rehabilitation of muscle function. The patient is kept in bed and occasionally rolled from side to side. Usually, return of function is affirmed by disappearance of pain within two days.

Ambulation, at first limited in time and distance, is resumed within a few days after injury. Prolonged sitting and standing are poorly tolerated and should be restricted during early weeks of convalescence. Recurrence of pain after restoration of normal muscle function indicates undue stress on the fracture.

With this method, the average number of days at absolute bed rest is ten, and the usual number of days in the hospital is eighteen. In contrast, patients treated with hyperextension body casts require about fifty-seven days in plaster plus ten additional days for proper mobilization. Comparative roentgenograms of the wedged vertebrae show that reduction achieved by hyperextension is frequently lost and that little change in appearance occurs when immediate progressive mobilization is employed. Anterior compression is also not increased with the latter.

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Eversion Anastomosis in the Dog Esophagus

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SURGERY OF THE ESOPHAGUS has always presented problems not encountered elsewhere in the gastrointestinal tract. Many attempts at esophageal anastomosis have met with failure either as a result of early leakage or late stricture. The absence of a serosal layer and the predominance of longitudinal muscle fibers have made suturing by standard inversion technics difficult. The use of multiple layers of "turn-in" has often led to narrowing of the esophageal lumen with resulting stricture.

In an attempt to devise a surgical procedure which would preserve the full width of the esophageal lumen, an experimental study was set up to study eversion anastomoses.

METHODS

Adult mongrel dogs were used. Under intravenous nembutal anesthesia, an endotracheal tube was passed and respiration was maintained by an intermittent air pump which could be regulated to control both rate and volume. The left chest was opened through an intercostal incision, and the lower esophagus was mobilized, carefully preserving the vagus nerves. The esophagus was sectioned transversely and then sutured end-to-end, everting the mucosa. On 4 dogs, a single layer anastomosis was done using interrupted 90 cotton sutures placed through all layers with the knots tied on the inside (figure 1*a*). Since the mucosa is the strongest layer in the esophageal wall, this technic was found to be surprisingly simple. The sutures held well, and the closure seemed secure. Since no tissue was turned into the lumen, the diameter of the passage was not compromised. Two other dogs were closed in a similar fashion, but 3-0 intestinal chromic catgut sutures were used, 1 with interrupted and 1 with a single continuous suture. Two dogs served as controls. Their esophagi were transected and closed using the conventional 2-layer inversion method. In all cases,

the chests were closed without drainage. Pericostal sutures of 20 cotton and running 3-0 chromic catgut were used on muscle layers and skin. The dogs were given only water by mouth for two days and were then given the regular kennel diet. No antibiotics were administered postoperatively.

RESULTS

There was one death in the series. This occurred in the dog in which satisfactory pulmonary ventilation was never achieved during the operative procedure due to an ill-fitting endotracheal tube. The dog died on the first postoperative day. Autopsy showed over 80 per cent atelectasis of both lungs; however, the anastomosis was intact. The rest of the dogs fared well; none of them regurgitated or otherwise showed signs of esophageal malfunction. The animals were sacrificed approximately eleven weeks postoperatively. The esophagi were removed, opened longitudinally, and photographed while being gently stretched with rubber bands to achieve maximum dimensions.

As can be seen in the photograph of an eversion anastomosis, the scar in the center of the picture does not have the elasticity that the normal esophagus shows; however, there is no stricture present (figure 2). The interesting and unexpected finding, however, was the way the anastomosis had healed. In all of the cases in which the eversion technic was used, agglutination had occurred only along the raw mucosal edges (figure 1*b*), and, in no cases, had granulation tissue invaded the mucosa, even where the sutures had been placed. Apparently, in time, the sutures had cut through the wall of the esophagus. Although the continuity of the mucous membrane was unbroken, the muscle layers were separated by as much as 8 mm. in some cases (figures 1*c* and 3). All of the dogs showed pulmonary adhesions to the chest incision as well as to the esophageal anastomosis, but these were not felt to be excessive.

In contrast to the eversion suture method, the 2 control dogs showed good healing of the anas-

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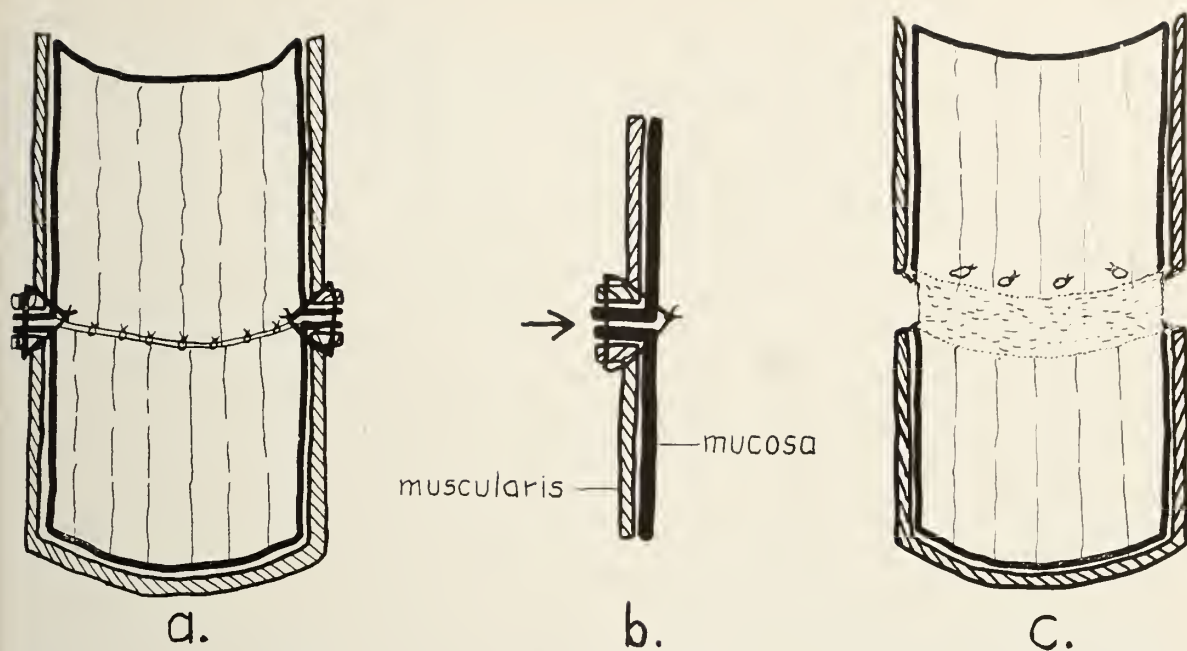


Fig. 1a. Diagram of eversion anastomosis. (b). Close-up of anastomosis. Arrow points to site of mucosal healing; muscles did not unite. (c). Diagram of healed anastomosis showing position of sutures and separation of all layers but mucosa.

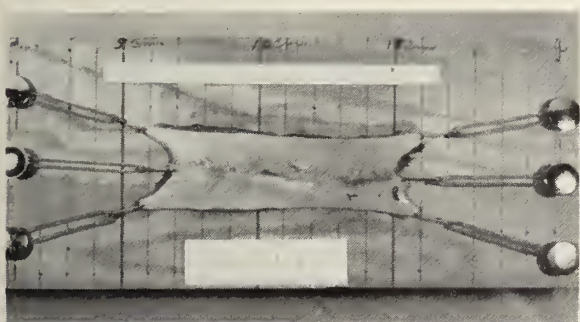


Fig. 2. Eversion anastomosis sixty-two days postoperatively. Note position of sutures.



Fig. 3. Photomicrograph of eversion anastomosis showing lack of continuity of muscle layers (all other specimens showed greater separation of muscularis than this but could not be photographed due to area covered).

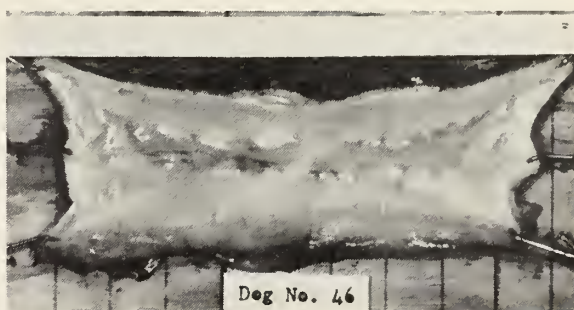


Fig. 4. Inversion anastomosis eighty-four days postoperatively. Lack of stricture is evident.

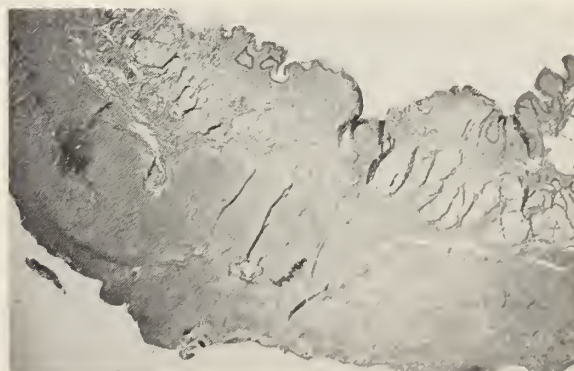


Fig. 5. Photomicrograph of inversion anastomosis. All layers seen to be intact.

tomosis without extensive stricture formation (figures 4 and 5) and with good approximation of the muscle layer.

DISCUSSION

A review of the world literature reveals that two other groups of investigators have been interested in this problem. Hertzler and Tuttle¹ used an eversion method on 8 dog esophagi with 100 per cent survivals. Their technic differed from ours in that they used a second layer of continuous 0000 silk to approximate the muscularis.

They felt that satisfactory union had occurred, and a photomicrograph of a healed anastomosis is included in this paper. However, in our opinion, separation of the muscle layer is also evident in their photograph.

Galluzzi and Possenti²⁻⁴ have also studied this problem using a 2-layer anastomosis similar to Hertzler and Tuttle, first in the rabbit and then in the dog. They found that in attempting to anastomose dog ileum,³ the mucosa was so redundant that it extruded through the suture line and made it impossible to approximate the sero-muscular layer over the mucosa. They then modified the technic, excising the mucosa at an angle and making the final result appear as a true end-to-end anastomosis with neither inversion nor eversion. Their results were then satisfactory, but the technic seems formidable. In rabbits, this modification was unnecessary, and a standard eversion suture was made,⁴ closing the muscularis over it. In their article, photomicrographs of healed anastomoses are unsatisfactory, as the muscularis is not shown on one side of the suture line. An interesting observation on their part³ was that growth of the circumference of the suture line, when the experiment was done in young rabbits, was much bet-

ter when nonabsorbable sutures were used. This was attributed to extrusion of the silk into the lumen of the intestine early in the healing process, whereas the catgut remained and incited more scar formation, and, as the animals grew, stenosis was later evident.

CONCLUSION

On the basis of the experimental work cited here, it is felt that eversion anastomosis in dog esophagi leads to satisfactory mucosal healing without leakage or stricture but that muscular continuity is lacking, producing a weakness in the anastomosis. Therefore, the standard 2-layer inversion technic is still believed to be the method of choice in esophageal anastomosis. It is realized that the number of dogs used in the present study is too small for adequate statistical confirmation. However, the results were so striking and so consistent that the foregoing conclusions are believed justified.

SUMMARY

Eversion anastomoses of transected esophagi were done on 6 dogs, using a single row of sutures. Healing was adequate without leakage or stricture, but approximation of the muscular layer was absent. Standard inversion technic was used on 2 dogs, which resulted in good healing and muscle continuity.

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Clinical Experience with Eagle's Solution in the Treatment of Severe Burns

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THE BURN CASUALTIES treated at the Edward J. Meyer Memorial Hospital in 1954, following the Cleveland Hill School fire, received intravenous fluids as recommended by Evans and associates¹ with whole blood and serum albumin as the colloid constituents. While the clinical outcome in these cases was almost exactly as could be predicted on the basis of the extent of the burn wound, the use of this fluid created problems of sufficient magnitude to result in the adoption of an entirely different sort of fluid program for the seriously burned patient during the first forty-eight postburn hours.

Use of the quantities of whole blood suggested by Evans and associates¹ posed a procurement problem, since the volumes required were not immediately available under mass casualty conditions. Time was consumed both in procuring whole blood and in securing appropriate matching. Infusion of the recommended volumes resulted in pronounced hemoconcentration. The hematocrit rose to 60 per cent or above in 5 patients and, in 1 patient, reached 67 per cent. In the first forty-eight hours, none of the hematocrits fell below 41 per cent. This seemed fairly good evidence that large quantities of blood were not needed in the immediate postburn period. The alarmingly high hematocrits resulted in mild to moderate overadministration of other fluids in an attempt to restore the hematocrits toward normal. The following problem faced us constantly: "Does a given patient need more saline, more glucose in water, more albumin, or more blood at a given moment and how much?" Each patient was receiving different fluid combinations, and, since decisions had to be made hourly around the clock, these decisions were necessarily made at different times by several physicians.

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Following our experience with this unwieldy program, a different type fluid program was formulated for us by Dr. J. Frederick Eagle, a pediatrician, who worked with us on the burn team. The aim was to find a single fluid which could be administered to every burn casualty, adjusting only the volume received by each individual. This fluid was to be made from solutions regularly available in hospitals and those that could be stockpiled. The details of the theoretic considerations in the composition of this fluid are in Dr. Eagle's publication² and will not be repeated here. Suffice it to say that a single fluid was devised which, in theory, could supply the requirements of losses of serum from burned surfaces and of plasma into interstitial spaces as well as supply the needs for insensible water loss and urine formation. The fluid devised by Dr. Eagle consists of $\frac{2}{3}$ normal saline in 5 per cent glucose containing 2 per cent protein as serum albumin. Potassium is added after good renal output is established. This solution is very simply prepared by mixing 2 parts of 5 per cent glucose in saline to 1 part of 5 per cent glucose in water and adding 2 gm. of concentrated serum albumin to each 100 cc. of solution. A formula was devised for estimating the needs during the first forty-eight hours as follows:

- 30 cc./per cent burn per square meter body surface area for loss through burn into dressings
- 10 per cent body weight in kg. for edema losses
- 2 liters per square meter body surface area for insensible water loss
- 2 liters per square meter body surface area for urine production
- Burns over 50 per cent—assume burn of only 50 per cent of surface area
- Burns under 15 per cent—do not give equivalent of 10 per cent body weight

The fluid is administered:

- $\frac{1}{3}$ of the estimated volume in first eight hours
- $\frac{1}{3}$ of the estimated volume in second sixteen hours
- $\frac{1}{3}$ of the estimated volume in second twenty-four hours

The exact formula was rarely adhered to, and, in general, the infusion rate was adjusted hourly to provide a urinary output of 10 to 40 cc. per square meter body surface area per hour.

For the past three and one-half years, this solution has been used almost exclusively in the Edward J. Meyer Memorial Hospital for treatment of the severely burned patient during the first forty-eight hours. Over 25 cases have now been so handled, and the results have been gratifying enough to justify this report. The case material is too limited to justify statistical breakdown, but several case reports may serve to illustrate the efficacy of the preparation.

Case 1. A 40-year-old woman was admitted on October 3, 1957, following second and third degree flame burns over 30 per cent of her body surface. Her weight was 55 kg., and surface area was 1.4 M². She received 11,860 cc. of Eagle's solution in the first forty-eight postburn hours. Her urine output for the first three days was 2,820 cc., 4,600 cc., and 3,050 cc. Her admission hematocrit was 42 per cent, and the highest value in the first three days was 46 per cent. She was discharged on December 2, 1957, after serial grafting procedures.

Case 2. A 65-year-old Indian woman was admitted on May 13, 1958, with flame burns over 100 per cent of her body area, estimated as 90 per cent second and third degree burns. She weighed 67 kg. and had a body surface area of 1.8 M². She received 16,600 cc. of Eagle's solution in the first forty-eight postburn hours. Her urine output for the first four postburn days was 1,040 cc., 1,155 cc., 1,500 cc., and 1,300 cc. The admission hematocrit was 46 per cent and rose only as high as 48 per cent. Death resulted from septicemia, which showed no response to antibiotics. There was no pulmonary edema at autopsy.

There have been no cases of shock, renal shutdown, or pulmonary edema in this limited series. The final outcome has not been altered. This fluid program, as do many others, carries the massively burned patient through the "shock"

period only to lose him later to uncontrolled infection.

DISCUSSION

Both the attending and house staffs at this institution have been impressed by the simplicity of this program as compared with many others. The fluid is made up in a very few moments from readily available stores of glucose in water, glucose in saline, and concentrated albumin solution. All burn casualties are given the same fluid, and only the rate of administration needs to be adjusted.

The advantages of the program described would become much more apparent under mass casualty conditions.

The clinical results to date have been most gratifying; blood pressure and urinary output have been maintained; and hemoconcentration and pulmonary edema have been avoided.

SUMMARY AND CONCLUSIONS

1. A single fluid has been devised which can be administered to all burn casualties needing intravenous fluid; only the rate of infusion must be altered to suit the individual need.

2. This fluid, Eagle's solution, consists of $\frac{2}{3}$ normal saline in 5 per cent glucose containing 2 per cent protein as serum albumin.

3. Clinical trial of this solution has been most gratifying in terms of both its extreme simplicity and its results in maintaining blood pressure and urinary output, while avoiding hemoconcentration and pulmonary edema.

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Rubella

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RUBELLA is an acute, specific, contagious disease¹ characterized by mild constitutional symptoms; enlargement of the posterior auricular, occipital, and cervical lymph glands; and a diffuse maculopapular eruption. It is the mildest of the acute exanthemas but assumes a position of importance because of the catastrophic effects on the fetus that may occur when the disease is contracted in the first trimester of pregnancy.

Unfortunately, due to the vague symptomatology, the diagnosis is often difficult to make in the absence of an epidemic. The terms German measles, three-day measles, rubella, and rubeola add to the confusion in the minds of the laity. Therefore, if a pregnant woman is exposed, she and her parents are often unable to remember whether she had rubella in childhood.

Rubella is of viral etiology. The disease has been transmitted experimentally² with material containing the filterable virus.³

Rubella is probably spread by droplets from the secretions of the nose and throat. The period of infectivity probably starts a day or so before the onset of the rash and lasts until a few days afterward. It is highly contagious but less so than rubeola. The incubation period varies from fourteen to twenty-one days but is usually between seventeen and twenty-one days.

The average age at which rubella occurs is higher than with measles, possibly because the infectious period is not as long and epidemics are fewer. Infants under 6 months are immune if their mothers have had rubella. An attack probably always produces lasting immunity, and so-called repeat attacks probably represent incorrect diagnoses.

Rubella usually occurs in epidemics. Incidence is increased in the spring. Records of the

Massachusetts Department of Health suggest a seven-year cycle, and 3 of the 4 largest epidemics have occurred in war years.³ Sporadic cases in the absence of an epidemic are probably rare, and the diagnosis in this situation should be made with caution.

The diagnosis of rubella can be difficult if it is not known whether the patient has been exposed because of: (1) the absence of any pathognomonic signs, such as Koplik's spots, (2) the lack of a specific diagnostic test, and (3) the similarity of the eruption to other conditions.⁴ There is a temptation to make a "scrap basket" diagnosis of rubella when a child is seen with a rash that cannot be explained otherwise. Drug rashes, mild scarlet fever, roseola infantum, papular urticaria, and so forth may cause confusion.

Prodromal symptoms are malaise and mild catarrhal symptoms and are usually so slight that they are missed entirely. They may last a day or so before the rash appears.

The eruption is usually the first sign of rubella that is noted. The rash is a generalized maculopapular eruption that appears first on the face and neck, spreads rapidly to the trunk, and finally involves the extremities. The eruption varies considerably in its intensity from a very faint to a quite pronounced rash but is nearly always much milder than measles. The color of the lesion is pinkish or rose-red. The lesions are usually discreet and do not appear as blotchy as measles, but, occasionally, there is a rather diffuse erythematous rash that closely resembles scarlet fever. The rash usually reaches its height in twenty-four hours and is nearly always gone in three days.

Enlargement of the suboccipital, postauricular, and posterior cervical glands is a characteristic feature of rubella. The degree of enlargement varies, and, occasionally, there is no lymphadenopathy. The glands are sometimes quite tender,

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particularly in adults. The glandular enlargement may precede the rash by several days and persist for a few days after the rash has disappeared, but it usually lasts only three or four days. In some cases, there is a generalized lymphadenitis.

Fever may be absent or so slight as not to be noticed. In rare cases, it may reach 102 to 104° F. but is usually not more than 99.6 to 101° F. The fever is usually coincident with the rash and lasts no longer than two to four days.

The catarrhal symptoms are generally minimal and consist of a mild rhinitis and pharyngeal injection. Sometimes, mild erythematous spots develop on the soft palate. The white count is normal, or there is a slight leukopenia with a relative increase in lymphocytes.

Complications, except for the effects on the fetus in early pregnancy, are so rare as to be negligible. A few cases of encephalitis have been reported, which were, in general, similar to the encephalitis occurring in association with other viral diseases.

Diseases which must be considered in differential diagnosis are: measles, scarlet fever, roseola infantum, infectious mononucleosis, drug eruptions, contact dermatitis, heat rashes, and miscellaneous skin conditions. It should be remembered that rubella is a disease that occurs in epidemics, and the diagnosis of sporadic cases is usually questionable.

Gregg⁵ and others⁶ reported in Australia in 1942 on congenital abnormalities that followed in the wake of extensive epidemics of rubella in 1939 and 1940. The damage to the fetus occurs when rubella occurs in the mother in the first two months and to a lesser extent in the third month of pregnancy. The anomalies found are: congenital cataracts; congenital heart defects, namely, septal defects and patent ductus arteriosus; deaf-mutism; and mental retardation.

There is considerable confusion concerning the incidence of congenital anomalies when rubella occurs in pregnancy. It is pretty well agreed that the danger is confined to the first three months of pregnancy. The earlier papers reported an incidence of 100 per cent anomalies if rubella occurred in the first two months of pregnancy and 50 per cent in the third month.⁵⁻⁸ This was undoubtedly due to a retrospective method of study of malformed infants and did not take into account normal infants whose mothers also had rubella.⁹ While these reports did not give a true incidence of the defects due to rubella, they did alert the medical profession to the danger to infants when the disease occurred in pregnancy.

Later studies give a much smaller incidence of abnormalities in infants whose mothers have had rubella in the first three months of pregnancy. Ingalls,³ reporting on 100 pregnancies complicated by rubella and followed to term, states that over 20 per cent of the infections produced either death or congenital defect of the fetus. Greenberg and Pellitori⁹ gave the following results of a study of 104 women in New York City who had rubella in the first trimester: 27 per cent gave birth to normal babies, 3 per cent to congenitally abnormal babies, 3 per cent to stillbirths, and 12 per cent to other nonviable fetuses; 10 per cent were lost to the study, and therapeutic abortions were performed in 46 per cent. He estimated a rate of 12 per cent congenital deformities in infants whose mothers had rubella in the first trimester. He held that blanket advocacy of therapeutic abortion is not justified.

Gamma globulin has been widely used as a prophylactic measure for women who have been exposed to rubella in early pregnancy. Because of the urgency of the situation, the physician feels impelled to do something, but, from the few studies that have been reported, it is obvious that neither convalescent nor ordinary gamma globulin has been consistently effective in preventing rubella. There is also some evidence that gamma globulin may modify the disease so that it may occur without the rash. Thus, the use of gamma globulin may produce a false sense of security.⁴

If a woman in the first trimester of pregnancy contracts rubella, the question arises as to whether a therapeutic abortion should be performed. Undoubtedly, because of the earlier reports of 100 per cent risk of death or abnormalities, abortions have been done too frequently, and no blanket policy of therapeutic abortion should be followed. Each patient should be treated individually. Religious beliefs, of course, must be respected. The risk of 10 to 20 per cent defective infants as indicated by later reports may be acceptable to a childless couple nearing the end of the childbearing period. On the other hand, such a risk may be unacceptable to a young, healthy, recently married couple, and a therapeutic abortion may be desired.

The question of whether the couple would accept an abortion also ties in with the decision to give gamma globulin for exposure. The relative ineffectiveness of gamma globulin and the possibility of modifying the disease so that it would not be recognizable should be weighed. If an exposed woman in the first trimester would not accept an abortion if she contracted rubella,

it would seem best to give gamma globulin for the good that it might do. On the other hand, if an abortion would be desired if the disease was contracted, it might be best to withhold it. The dosage of gamma globulin usually advised is 0.1 cc. per pound of body weight.

SUMMARY

From the above discussion, it can be seen that the diagnosis of rubella should be made with care. The importance of remembering whether the disease has occurred in a female child should be impressed on the parents because of the situation that may arise in her childbearing period. All too frequently, because of the benign nature of the disease, children are not even seen by a physician when they have rubella.

It is to be hoped that in the future an effective vaccine may be developed that can be given to women who have not had rubella before

pregnancy occurs. At the present time, the most effective solution to the problem is to encourage deliberate exposure of girls before the child-bearing age.

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A POSSIBLE SOURCE OF INFECTION in the hospital is the humidifier used in connection with oxygen therapy.

When water samples from the reservoirs of a humidifier in a large teaching hospital were studied bacteriologically, extensive contamination was revealed. Although most of the bacteria were nonpathogenic, a few were dangerous and the extent of contamination was greater than had been anticipated.

As a result, a systematic procedure for care of humidifiers used in oxygen therapy has been adopted:

1. All water used in humidifiers must be sterile.
2. The water in the humidifier should be discarded and replaced when the level falls.
3. No apparatus should be used for a patient longer than one week.
4. Each time service is discontinued or after one week of service, the glass reservoir should be cleaned with an antiseptic and a detergent and the rubber washer inspected carefully. If any cracks are found, the washer is replaced.
5. The metal top of the humidifier is placed in an autoclave between patients or after one week.
6. All stored apparatus must be dry, with the glass reservoirs inverted or covered.
7. Disposable tubing should be used if possible.
8. Bacteriologic spot checks should be made at regular intervals.

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What to Tell Parents of a Retarded Child

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ONE OF THE MOST delicate and painful problems with which the physician has to deal is that of informing parents that their child is mentally deficient. The first inkling that a child is not developing normally is naturally a terrible shock to the parents. Often, they attempt to explain the mental defect on the basis of physical illness, pinning their hopes on any slight physical deviation which their physician may find. The problem is not only that of informing the parents of the actual situation and prognosis as tactfully, considerately, and constructively as possible but also one of helping them to face and accept the situation for their own good as well as that of the child.

When mental retardation or other brain injury is suspected, diagnosis should be substantiated as soon as possible and the matter discussed immediately with both parents. Not infrequently parents prove to be reluctant or even unable to accept the fact that their child is retarded. Most parents, before accepting a diagnosis which carries a prognosis as disheartening as that of mental deficiency, want to feel certain that everything scientifically possible has been done to establish the cause and to discover any possible physical basis which might be treatable. Under this heading would come such diseases as hydrocephalus, craniostenosis, hypothyroidism, and so forth. In the case of higher grade defects, the physician may need to observe the child's progress for some time and to enlist the aid of a competent psychometrist before he can be sure of his ground.

The physician, of course, should attempt to protect parents from futilely wasting their time, emotions, and financial resources by carefully evaluating the child.

We must realize that not only the welfare of the handicapped child but also the happiness of the entire family depends largely upon the parents' ability to understand and accept the unfortunate situation.¹

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Parental misunderstanding or inability to accept the actual situation is likely to result in constant turmoil and unhappiness in the child and friction between the parents.

Most difficulties with retarded children stem from prejudice based on fear and ignorance.² One of the most difficult questions sometimes, both for physicians and parents, is whether or not a child should be institutionalized.^{1,3-7} When mental retardation is recognized at birth, a recommendation by the physician for immediate institutional placement sometimes goes with the diagnosis.³

A mother may be advised not to see the child or may even be prevented from doing so. Parents are often told that the child will not live more than 6 months or a year or that development will stop at a 2-year level.

Parental rejection and neglect are frequently followed by remorse and overprotection. The child is hidden away from the community and not allowed to assume any independence.

Realistic appraisal of actual mental capacities, which may reach comparatively high levels, and constructive interpretation of the difficulties involved often rescue the retarded child from an institution or a vegetative existence imposed by an unfavorable home environment.^{1,4}

An institution is by no means always indicated for the mentally retarded child and, as a matter of fact, may be harmful to both child and family. The physician who habitually advises it without a knowledge of the availability and adequacy of institutional resources or without consideration of the parents' feelings is not being very helpful either to the child or the parents.

Through lack of contact with these children or, on the basis of idle gossip, many adults spread misleading ideas about retarded children.

Mentally retarded children are often born to families in which there has been no trace of feeble-mindedness, mental deterioration, or disease on either the father's or the mother's side of the family for three generations.

The fact that a child is mentally retarded is no reflection on the parents. The attitude of the parents toward such a child, however, and the way in which they cope with the problem are a

different matter.¹ When they surround the child with kindness, security, love, and understanding and help him attain the limits of his mental capacity, it is certainly evidence of strength of character.

Some people of lesser stature prefer to keep these youngsters out of sight, even out of their lives, as if the retarded child were something not related to them.⁴ Parents are certainly shirking a basic responsibility when they do this.

A retarded child may be an incentive in spurring parents on to greater effort, that is, they may feel that they must achieve more in life to make up for their child's deficiencies.

Many times, husbands and wives are drawn closer together when they have tried to help their child find his place in life. The way in which parents set about solving their problem is a reflection on themselves but not on the defenseless child. All that these children ask of us is to help them become as strong as their mental and physical capacities will allow, so that they can lead moral, healthy, self-sufficient lives when their parents can no longer care for and guide them.

In the physician's interview with the parents, avoidance of such words as feeble-minded, defective, idiot, imbecile, and moron usually makes the diagnosis much easier for the parents to accept. For the parents, these words do not have scientific meaning. Rather, they suggest something which is horrible, bad, or disgraceful. One author, Shirley, recalls the time that a 5-year-old boy was brought to him by the parents. The parents said they had taken their boy to a physician who, after one look, had said, "Oh, your kid is an idiot." Obviously, during the interview, they were bent on proving that this was not true. As a matter of fact, the boy was not an idiot; he was an imbecile.

It is always advisable before any opinion is given to attempt to find out to what extent the parents recognize the nature of their child's handicap and how they feel about it, for this knowledge will greatly determine the physician's therapeutic approach to the problem.

The family should be advised to take the child home and treat him as much as possible as a normal child. They should be encouraged to discuss the child freely with the doctor, friends, and relatives, as an open discussion clears the air and helps the family in many ways. If the reverse is done, many inhibitions, mental depressions, anxieties, and feelings of shame and guilt soon develop.

The child should be encouraged and allowed to mingle freely with normal children of his own

age in order to broaden his whole sphere of understanding and stimulate as much as possible whatever normal brain tissue he has.^{1,8} Discussion of boarding homes or institutions should be confined to the child with a severely injured brain who is either completely flaccid or spastic or very aggressive and overactive, although there are also many exceptions to these cases.⁹ By and large, the retarded child's home is the best influence and training center he can have to develop his entire potential as quickly as possible.¹

A normal child who associates with a retarded child may seem to be "catching" the illness because, when he is exasperated by the other's slow responses, he becomes upset. Incidentally, the retarded child's only way of defending himself is to persist in any mannerism which he knows annoys the other child or to resort to physical retaliation, which further aggravates the situation.

It certainly does not dull the normal child to play with the retarded child. With the proper guidance, such an association offers a wonderful opportunity for character training. If the situation is faced honestly by everyone concerned, it plants the seeds of social consciousness and responsibility at a very early age.

The retarded child is more satisfied with the simple things in life than with the things that are sought by those of keener intellect and greater ambition. When he is given a chance to appreciate actions and possessions that are within range of his capabilities, the mentally deficient child is no more difficult to please than the normal child. Retarded children gain happiness and pleasure from music. They enjoy performing in plays and skits, and they love to dance. These children also enjoy outdoor games. They can learn to swim and dive if properly instructed. Some of them lose their inhibitions when they are not with their brothers and sisters with whom they are measured. Many of them blossom surprisingly when they are with younger children in whom abilities are less mature than their own.

The mentally retarded child will never find his way into the Hall of Fame, nor will he even be a leader in his community. But, he does make a good follower and does have something to contribute to society. We should not expect more from the child than he can give. If we withhold all aid and expect him to stand on his own two feet in accomplishing a task that is beyond him, we will all be disappointed.

In judging how much a mentally retarded person achieves in life, let us first appraise the standards we set for him and give him a hand

along the way. In this way, we can truly judge his success.

MANAGEMENT OF MENTAL DEFICIENCY

While it should be possible to formulate certain generalizations on the management of the mentally retarded child, their application to the individual case is most difficult.⁷

The reasons are the extreme variability in (1) the child's quantitative and qualitative intellectual status, the frequent overlap in different spheres of activity, and the personality structure and behavioral status; (2) the parental attitudes and family, social, and economic status; (3) the nature of the immediate environment; and (4) the availability of community facilities, including educational, recreational, and counseling services.

Medical opinion on early institutional life continues to be divided, depending presumably on the experience and personality of the individual physician.

Some strongly recommend transferring the child from the newborn nursery to the institution and believe that every effort should be made to sever the connection between the child and his parents. This involves the concept that the presence of a mentally retarded child presents so serious and inevitable a threat to the continual well-being of family life that he must not be allowed to remain in the home at any expense.

Many people, however, rebel at such a solution for the vast majority of cases.

The mongoloid or other moderately retarded child has a life to lead, exceptional it is true, but with certain intrinsic goals. Experience indicates that the psychogenic disturbances resulting from early mother-child separation, which have been demonstrated in the normal child, are equally operative in the retarded child.

In fact, it is quite likely that the mongoloid placed in an institution early in life served as a model for the so-called textbook picture of such a child as a withdrawn, well-behaved, inactive, unimaginative, overly friendly child.⁷ It is not unlike the picture described by many for the normal child in a similar situation.

Moreover, the guilt feelings and associated psychogenic difficulties said to develop in parents exposed to a retarded child in their homes for extended periods are by no means avoided by the simple act of early separation. They remain more submerged. It is difficult to rationalize successfully the effects of a withdrawal

from one of the strongest instinctive demands of parents—the care of the young.

Is the presence of a retarded child a serious threat to the normal personality and emotional development of normal siblings?⁸ This possibility has frequently been the deciding factor in determining the early removal of such a child from the family unit.

Basically, the presence of the retarded child is not the potential threat. The natural reaction of normal siblings is essentially one of acceptance and sympathy and is without harmful implications to themselves. Any adverse effects such a relationship stimulates are almost entirely the result of unsatisfactory parental reactions. In most cases, it should be possible to prevent these reactions by proper parental orientation.

My own approach to the question of early home care for this type of child has been to point out the problem to the parents, including all the possibilities. It is left for them to decide whether the facilities which they and the community have to offer are insufficient to maintain a healthy patient-family relationship and when a separation is indicated.

The parents must always make the decision. The attending physician should not become involved in more than an advisory capacity, for he can hardly be aware of all the complicated intrafamily relationships, economic considerations, and other factors which must go into reaching such a decision.

It is obvious that the management of the retarded child is a complex and difficult problem. It involves education of the physician first, and then he must educate the family and the community.

It is only by the education and understanding of all concerned that this complex problem will ever be helped, let alone solved.

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Emotional Factors in Spontaneous Abortion

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LET US CONSIDER the problem of spontaneous abortion in its relation to human wastage. Since approximately 10 per cent of all pregnancies end in spontaneous abortions, this is the most common complication of pregnancy. We as physicians have shown great concern for the mortality of premature and full-term infants but have given little attention to the spontaneous abortion problem in which loss is 100 per cent.

Table 1 gives an idea of the problem in relation to fetal wastage from premature and full-term delivery. Based on an estimated 3,000,000 births in a year, the loss from spontaneous abortion is approximately 300,000; from prematurity, 36,000; and from full-term, 60,000.

Considered as a leading cause of death, we estimate that spontaneous abortion ranks somewhere between cardiovascular disease and cancer, as seen in table 2. In terms of expense, it has been estimated that the cost of each abortion requiring hospital care is \$300—making an overall national cost of \$90,000,000 in one year (table 3).

Generally speaking, an abortion is the interruption of any pregnancy in which the embryo or fetus has no chance of survival. Therefore, a product of conception weighing less than 500 gm. expelled before 22 weeks' gestation constitutes an abortion. An immature fetus weighs 501 to 1,500 gm. at 22 to 30 weeks' gestation, a premature infant weighs 1,501 to 2,500 gm. at 30 to 36 weeks' gestation, and a full-term infant weighs over 2,501 gm. after 36 weeks or more (table 4).

The causes of abortions may be divided into two main groups: (1) those which are inevitable or nonpreventable and (2) those which are preventable. Conditions pertaining to each group are listed in table 5.

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Among the physical causes of abortion are uterine tumors, such as a myoma, and uterine anomalies, which include a bicornuate uterus or an incompetent internal os, particularly in patients in whom there has been a deep laceration or an amputation of the cervix. There are also some cases associated with emotional factors in which the cervix becomes prematurely dilated.

Abortion may be due to physical trauma and overexertion, but I believe it is often incorrectly attributed to these causes. Here should be included those cases associated with abdominal surgery and sexual intercourse, many of which are perhaps due more to emotional than to physical trauma.

Occasionally, a corpus luteum may be removed in early pregnancy by a well meaning surgeon. Such cases are often followed by spontaneous abortion, although there is some evidence indicating that this organ is not essential for maintaining the embryo in early pregnancy.

Under "unintentional" are abortions which are due to incorrect diagnosis. In these cases, hysterectomy or dilation and curettage are performed.

Finally, we come to abortions due to, or associated with, emotional factors. The exact mechanism of the abortion on this basis is not well established. Perhaps it works through the autonomic nervous system alone, producing vascular spasm and resultant decidual hemorrhage or premature separation of the placenta, or it may work directly on the uterine musculature, producing a miniature labor. Some authorities believe that there may be an Adrenalin effect, although it is well known that Adrenalin causes uterine relaxation at term. Observations have also shown that this hormone acts differently on the uterus at different times and in varying concentrations.

What evidence is there that emotional factors can be responsible for abortions? Let us consider the many types of treatment which have been recommended for threatened and habitual abortions (table 6).

The originators of each method have all had uniformly good results and have been able to

TABLE 1
PROBLEM OF FETAL WASTAGE IN THE UNITED STATES
IN ONE YEAR

	<i>Abortions</i>	<i>Premature</i>	<i>Full term</i>
Per cent	10%	6%	
Number	300,000	180,000	3,000,000
FETAL WASTAGE			
Per cent	100%	20%	2%
Number	300,000	36,000	60,000

reverse the ratio of 80 per cent abortions and 20 per cent full-term infants to 80 per cent full-term infants and 20 per cent abortions. It would seem, therefore, that there must be some common denominator in all these methods which is closely allied to the enthusiasm of the doctor and the close supervision he has given to each patient. It may be called a form of psychotherapy. Furthermore, several authorities have discussed the role of emotional determinants in abortion, and, for the past four years, Mann has conducted a study of habitual abortions and has treated his patients on an emotional basis. His results so far conform with those of the previously mentioned methods. I think it may be fairly safe to list some of the emotional factors which might be considered responsible for spontaneous abortions.

Mann has shown in his study of habitual abortions that these patients have failed to mature emotionally because of faulty mother-daughter or father-daughter relationship. These faults might be overcome by an adequate husband and wife relationship. He feels that this type of abortion becomes repetitive because of the unresolved conflict present in each pregnancy and that each failure strengthens the abortion process and becomes almost a conditioned reflex. Random abortions, however, must be due to random factors which are only temporary and are resolved before the patient again becomes pregnant. They may be listed under two categories with innumerable subdivisions (table 5). It may be postulated that all women in these categories have developmental or emotional faults which make them prone to stress and strain which might initiate an abortive process. Conversely, there are women sufficiently stable and well adjusted who would be extremely unlikely to have an abortion on an emotional basis no matter how severe the stress.

What percentage of abortions are due to emotional factors? The work of Mann indicates that almost all habitual aborters are in this group.

TABLE 2
LEADING CAUSES OF DEATH IN UNITED STATES IN ONE YEAR

Cardiovascular	400,000
Abortion	300,000
Cancer	200,000

TABLE 3

Total abortions in one year	300,000
Estimated cost of one abortion	\$ 300
Total cost in United States in one year	\$90,000,000

TABLE 4

	<i>Weight (grams)</i>	<i>Gestation (weeks)</i>
Abortion	0 to 500	0 to 22
Immature	501 to 1,500	22 to 30
Premature	1,501 to 2,500	30 to 36
Full term	2,501 and over	36 and over

TABLE 5
CAUSES OF SPONTANEOUS ABORTION

- I. Inevitable or nonpreventable
 - A. Defective embryo or abnormal fetus
 - B. Cord complications—congenital or acquired
 - C. Placenta previa
 - D. Molar pregnancy
 - E. Ectopic pregnancy
- II. Salvable or preventable
 - A. Physical causes
 1. Uterine tumors
 2. Uterine anomalies
 3. Trauma
 4. Ovarian
 5. Unintentional
 - B. Emotional determinants
 1. Deep-seated conflicts associated with immaturity
 2. Conflicts with everyday problems
 3. Sudden fears or frights

TABLE 6
TREATMENT ADVOCATED FOR HABITUAL ABORTION

- A. Antihnetic treatment
- B. Vitamins
- C. Hormones
- D. Removal of foci of infection
- E. Immobilization
- F. Repair of incompetent internal os

Actually, only a few of the abortions occur in habitual aborters, and no reports give an accurate clue to this problem. My own belief is that a very high percentage are on an emotional basis in spite of the work of Hertig and his collaborators, who found pathologic ova, embryos, and fetuses in approximately 50 per cent of their abortions. Many things may happen to a specimen between the time of its death in utero and its expulsion. If the abortion rate from extra-emotional causes were, say 10 per cent, then the results reported by Mann in his study would be difficult to justify. Without going into his method of treatment in detail, his main approach seems to accent the supportive role of the doctor. An analysis of his failures reveals the fact that of those whose previous abortions occurred for the most part during the first trimester, all have thus far aborted at a later stage. These women represent the more immature members of the group who seem to have undergone regressional changes in their relationship with the doctor and have aborted in a manner similar to patients who have an incompetent internal os. In other words, it seems evident that his failures occur in patients who are most disturbed and emotionally immature and that none of them can be attributed to physical or congenital causes. Thus, we might postulate that only a few of the random abortions are on an extra-emotional basis.

The work of Mann and Javert gives some clues as to treatment. Ideally, this should start with prophylaxis and prevention—teaching parents to bring their daughters up to be mature, self-reliant young women. Many women would benefit by some type of formal instruction which might be called “preparation for pregnancy,” much as many of our pregnant patients are benefited by our so-called “preparation for labor” courses. First of all, the patient should be encouraged to see her doctor early in pregnancy. Instead of the usual perfunctory examination, the physician should try to evaluate the patient’s emotional reactions to pregnancy. He should see the husband and evaluate his capabilities. The patient’s relationship with her family and her in-laws should be ascertained. What has been her work or profession? How is she going to adjust to her new job of childbearing? These and many other helpful factors could be determined in addition to the development of a strong doctor-patient relationship by more frequent visits during the first few months. We are too prone to spend too little time with the new obstetrical patient on her first visit and to tell her to call if she has any questions and to return in a month. For some this may be enough, but

for many—and particularly for the abortion-prone group—this is not enough.

So far treatment has all been prophylactic, but threatened abortions will still occur. This group urgently needs a more realistic method of treatment. If hormone treatment, vitamins, bed rest, and so forth, are prescribed with almost religious fervor, perhaps the results might be the same as those achieved with a more rational type of therapy. I’m sure, however, that most physicians are skeptical of the value of any of the aforementioned methods.

As a result of the emotional concept of spontaneous abortion, treatment has gradually changed from that of haphazard vitamin, hormone, and bed rest therapy to an almost completely opposite type. Previously, if a patient called and reported that she was bleeding in early pregnancy, she was told to go to bed and take several kinds of hormones and vitamins. Now, treatment is designed to allay the fear and tension aroused by the bleeding. The patient is advised to carry on normal activities, a mild sedative or tranquilizer is prescribed, and she is told to call at the office within the next twenty-four hours. At this time, it is explained to her that bleeding in early pregnancy is often due to emotional tension. Usually, the patient provides an answer. Contrary to previous practice, a vaginal examination is done to rule out ectopic pregnancy and cervical polyps and also to try to evaluate the possibility of a molar pregnancy or a missed abortion. If the pregnancy seems to be progressing normally, the patient is reassured, advised to report by phone on the following day, and is seen in the office at weekly intervals until the bleeding has completely ceased. Sometimes it continues for several weeks without having any apparent effect on the pregnancy. Many of these patients need extra support from the doctor, which he can readily give by paying a little more attention to them and by encouraging them to call at any time even though they may have no good reason for doing so.

What can be learned from our failures? If the bleeding is associated with pain and cramps, the patient is hospitalized with a diagnosis of inevitable or incomplete abortion. Most of these women go on to complete abortion under anesthesia, at which time an attempt should be made to determine whether a double uterus or a uterine myoma might have been a cause for the abortion. If, on the other hand, the failure seems to have been on some emotional basis, this situation should be explained to the patient and her husband so that the fault may be corrected or avoided in another pregnancy.

I wish that I could give the results of the treatment outlined, but it is obviously too early to present any figures that would have any real meaning. It is quite evident that we are striving to reduce the incidence of spontaneous abortion by achieving better success in the treatment of threatened abortion. So far, I think that we are carrying more of these patients to term, but if our results fail to show improvement, I feel that at least these patients are being treated on a more rational basis.

DISCUSSION

Several points come to mind in a discussion of the emotional factors causing spontaneous abortion.

First, something should be said about bleeding after sexual intercourse during early pregnancy. Our practice has always been to ask the patient if the bleeding followed intercourse, and, if so, to institute no treatment whatsoever, since we believe that this bleeding is due to trauma to the cervix and that it will invariably stop immediately. In fact, one patient was bleeding so heavily that she was hospitalized, but, by the time she reached there, it had stopped completely and she was discharged on the following day. This opinion regarding intercourse is in complete variance with that of Javert, who believes that sexual intercourse with orgasm is a frequent cause of abortion. He interdicts sexual intercourse entirely in his management of all pregnancies.

Second, the treatment outlined requires a great deal more of the physician's time, and his reward is mostly in the satisfaction he derives from a good result. What more do we want?

Third, it should be pointed out that while this therapy may be infringing on the realm of the psychiatrist, any obstetrician should be qualified to care for these patients. The services of a psychiatrist are not needed any more than are the services of a general surgeon to sew up episiotomies and do cesarean sections.

Fourth, more work is necessary to determine the exact mechanism of spontaneous abortion due to emotional factors, so that the treatment may become more definitive and exact.

Last, it should be pointed out that, at present, there is no set formula for the prevention and treatment of emotional factors in relation to

spontaneous abortion. In other words, each patient must be treated individually.

Furthermore, in view of the magnitude of the problem of spontaneous abortion and the salvage of life which might be achieved by long-range prophylactic methods, such as premarital and preconceptional education, should we not form a society for the prevention of spontaneous abortion? What might be the results in terms of fetal salvage and public health? Javert has pointed out: "Most communities have numerous societies, committees, programs, clinics, and a host of social welfare departments concerned with the health of the public. There is no society for the prevention of spontaneous abortion, nor has the United States Public Health Service taken any particular stand on its prevention. Well organized national societies are concerned with infantile paralysis, heart disease, and mental health. The American Cancer Society is a leading organization in its field, yet cancer is third as a cause of death in our population. There is a Society for the Advancement of Colored People, who constitute only a fraction of our national population. There are many planned parenthood associations, contraceptive clinics, and adoption agencies. There is a society for the prevention of blindness and even a society for the prevention of cruelty to animals. Only a few programs are in existence for the preparation for parenthood. Such widespread acceptance of the abortion incidence is to be decried. Industry curbed the accident rate of the working man by various safety-first programs. The same thing can be done for pregnant women."

SUMMARY

1. Spontaneous abortion ranks with heart disease and cancer as a leading cause of death.
2. The causes of spontaneous abortion have been outlined.
3. Emotional determinants are believed to play a major role in the cause of this condition.
4. Although we have learned a great deal from the treatment of habitual abortion, our goal should be the prophylaxis and prevention of threatened abortion and, therefore, habitual abortion.
5. A radical change is advocated for the treatment of threatened abortion.
6. It is too early to present results of therapy.

Management of Primary Tuberculosis in Children

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RECENT PUBLICITY to the effect that tuberculosis is no longer a disease menace is inaccurate. It is recognized that mortality from tuberculosis has markedly decreased, but, in certain sections of the country, morbidity has been relatively unaffected.

Some time ago, the incidence of tuberculous infection in infancy, as determined by routine tuberculin testing of the control group of a BCG study at the Medical College of Virginia, was found to be 13.5 per cent in children under 3 years of age and 10.9 per cent in those 2 years of age or less.¹ Such figures must give pause to the thought that tuberculosis has been, or is nearly, conquered.

Approach to management of tuberculous infection in children must obviously begin with early case finding. It is well known that children with uncomplicated primary tuberculosis are usually asymptomatic and even those with progressive primary tuberculous disease often have minimum symptoms.² Diagnosis must be attained, therefore, by means of the routine tuberculin test performed some time during the first year of life and annually thereafter. Of course, the test is always indicated when contact with tuberculosis is known. Children who are found to be infected are offered a better prognosis today than in the past.

There is at present a cooperative investigation, coordinated by the United States Public Health Service, in which 2,750 children with asymptomatic primary tuberculosis are being observed by 32 clinical investigators in an effort to determine whether small daily doses of isoniazid for one year decrease the frequency of immediate complications of the primary disease and the frequency of chronic pulmonary tuberculosis in adolescents and adults. From the preliminary report,³ it may be concluded that those with roentgenographic evidence of active primary tu-

berculous disease should be given the benefit of isoniazid prophylaxis for one year in order to reduce the danger of immediate complications. Results of this study indicate that the same regimen should be advised for children under 1 year of age who are infected, even without roentgenographic evidence of disease. However, children infected after 1 year of age with no roentgenographic evidence of tuberculous disease must be treated individually.

These findings are in accord with the recommendation of the Tuberculosis Committee of the American Academy of Pediatrics.⁴ This group advises that all children with active primary tuberculosis be given the benefit of isoniazid therapy. However, those who show a positive reaction to the Mantoux test with no other evidence of tuberculosis must still be treated individually, since the danger of complications in this group is not great.

While in the aforementioned United States Public Health Study, dosage of isoniazid was 5 mg. per kilogram of body weight per day, the general tendency has been to increase this dosage level. Some advocate a daily dose of 10 mg. of isoniazid per kilogram of body weight and others as much as 30 mg. Perhaps 10 to 15 mg. daily would be a reasonable compromise. Almost all workers in this country seem agreed that prophylaxis should be carried out over a period of one year.

In addition to specific drug prophylaxis for the infected child, a careful search for and removal of the adult tuberculosis contact remains essential.

Infants and children with uncomplicated primary tuberculosis should be given a high protein diet and the usual vitamin supplement for those of that age. Bed rest is rarely necessary.

Careful observation of these infected children is indicated. A minimum schedule of visits to the physician should be established at monthly intervals for the first three months, bi-monthly intervals for the next three visits, again after three months, two more visits at six-month inter-

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vals, and annually thereafter.⁵ While on isoniazid therapy, it would seem advisable for the child to be seen by the physician at monthly intervals

for the entire first year. Serial roentgenograms, fluoroscopy, history, and physical examination are all utilized in evaluation and follow-up.

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ALTHOUGH PNEUMOPERITONEUM is normal in adults after laparotomy, in infants and children, detection of an appreciable amount of air within twenty-four hours after operation indicates perforation and a second laparotomy may be necessary. None of the 19 youngsters examined twenty-four hours postoperatively had air in the peritoneal cavity, indicating that the condition is not common. As little as 10 cc. of air injected intraperitoneally can be detected on an erect or left horizontal decubitus film.

JOHN W. HOPE, M.D., and HARRY R. CRAMER, M.D., Children's Hospital, Philadelphia. *Radiology* 71:797, 1958.

IN INDUSTRIAL COMMUNITIES, the steady increase of smog during the last fifty years may be related to the increased incidence of primary cancer of the lung noted in Western Europe and the United States during the same period. Polluted air, particularly the hydrocarbons contained in soot, may be of greater importance etiologically than cigaret smoking.

Many persons with lung cancer living in the industrial area of Liège, Belgium, reside in the center of the city, especially in streets beside railways or canals carrying coal-burning boats. Railway engines are an obvious source of air pollution, and steamboats pollute the air around docks. During 1955, lung cancer was 5 times more prevalent among engine drivers than among the entire population in the same neighborhood.

Near factories in Herstal, Belgium, the incidence of lung cancer is high. As the Meuse Valley runs north, the rate suddenly drops and, at the same time, the smoke disappears from the sky. Toward the east, the smoke continues to hang over the land and the incidence of lung cancer remains high.

Workers in metallurgic plants upstream from Liège have a higher incidence of lung cancer than nonfactory workers living in a fairly polluted area, even though the factory workers reside in an area that, due to the prevailing winds, is largely dust free.

J. FIRKET, Institute of Pathology, Liège, Belgium. *Proc. Roy. Soc. Med.* 51:347, 1958.

Objectives in the Treatment of Pulmonary Tuberculosis

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AS PULMONARY TUBERCULOSIS becomes less a disease to be treated in an isolated sanatorium and more an illness to be cared for at home or on the job by the personal attending physician, it becomes necessary to re-emphasize fundamentals for the benefit of those who have not had experience with this unpredictable disease. This is especially pertinent when tuberculosis is uncovered by chest x-ray film examination as part of a general physical survey. Irrespective of the accompanying circumstances, our therapy is adequate only when we have been able to (1) inactivate the disease itself, (2) render the patient noninfectious to others, and (3) restore him to complete social and economic usefulness.¹

INACTIVATION

We hope to promote the maximum degree of resorption in the inflamed areas, to fibrose and calcify whatever remains, to close all cavities, and to heal all secondary lesions, such as tuberculous endobronchitis. In short, the ideal is to approximate the state of the completely healed primary focus. When this is not possible through antimicrobics alone, we attempt to extirpate the more completely destroyed portions of the lungs, so that the remaining tissue may heal almost completely. Only by histologic and microbiologic examination of excised tissue can we be certain that the tuberculous lesions can no longer improve, having healed to the utmost, or progress, that is, that they are truly inactive. Clinical examination may reasonably determine when this desired state has been attained. The designation "inactive" (Diagnostic Standards of the National Tuberculosis Association, 1955 edition) may be applied when roentgenograms have demonstrated complete absence of cavity for six months; either no change at all in the ap-

pearance of the lesion or exceedingly slow shrinkage; disappearance of all symptoms of active tuberculosis; and absence of acid-fast bacilli from sputum or gastric or tracheal materials.

Because the prognostic value of the state of inactivity is high and appreciates with passage of time, the practitioner must be aware of at least 3 sets of circumstances capable of inducing a false sense of security.

1. A slowly retracting lesion may seem inactive, and organisms may not be demonstrable in sputum as long as antimicrobics are taken. To test for this, it is well at times to conduct bacteriologic studies after a few days of abstinence from drug therapy.

2. Healed cavities² may be indistinguishable from still unclosed but active tuberculous cavities. The dire prognoses of Barnes and Barnes³ to the effect that with open cavity and positive sputum, death of 85 per cent of patients may be expected within five years is little remembered in these days of rapid healing with antimicrobics. It has definitely been established that cavities can heal under the influence of potent chemotherapy. Confronted with x-ray demonstration of a radiolucent area persisting after therapy at the site of a previously unequivocal tuberculous cavity, the practitioner may well utilize the criteria of Tchertkoff and Neenasheff.⁴ An active tuberculous cavity usually presents a thick wall of ground glass appearance, and organisms generally persist in the secretions. A healed cavity has a thin wall with smooth inner contour. If organisms have not been demonstrable in secretions for more than a year, the presumption that the cavity has healed is increased. To distinguish preoperatively between healed and active cavities or to determine that tuberculosis is inactive despite persistence of radiolucent areas at the site of previous unequivocal cavities is still a feat demanding the maximum skill of the clinician.

3. Occasionally in the past, more frequently today with chemotherapy, tuberculosis may heal partially, permitting the emergence of the "good chronic" stage. Symptoms may be entirely lack-

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ing and working ability unimpaired many years even when the sputum contains acid-fast bacilli. Obviously, the patient in the good chronic stage presents a risk to himself of explosive spread of tuberculosis and to others of dissemination of tubercle bacilli and must, therefore, be carefully distinguished from the inactive case he simulates.

PREVENTING DISSEMINATION

The second consideration is that of preventing spread of the disease to others. While isolation was formerly traditionally used to break the chain of infections, today it needs to be practiced chiefly for those whose sputum contains large numbers of acid-fast bacilli even after the prompt application of antimicrobics. Precisely how long it takes for sputum to become noninfectious has not been established, but, possibly, in a good case, this happens in one month's time. By the time of diagnosis, a number of potential cases have been created through infection and will be brought to light chiefly by giving tuberculin tests to contacts. It is possible that before long we shall insist on hospital treatment only during the surgical phase of therapy or for patients whose medical and social problems are too complex to be solved outside of institutions.

The practitioner's responsibility does not rest with the isolation of the tuberculous patient or even with the institution of adequate therapy. He must understand that the simple thing of reporting the case to the health department is sufficient to set into motion a complete train of events: visiting nurse service where needed, examination of all contacts by tuberculin tests and by x-ray films, education of the household and family associates, collection and tabulation of epidemiologic data, and institution of prophylactic measures. These procedures are essential to any tuberculosis control program, but they cannot be instituted unless the case has been reported to the local health authorities.

The practitioner also must use his authority to see that prophylactic measures are enacted. Isoniazid prophylaxis; the use of BCG in carefully selected instances; and, above all, the systematic and regular examination of school children, their teachers, and personnel are matters on which his advice will be sought. Certification of schools, under the plan of the Tuberculosis Committee of the American School Health Association, is an excellent means of conveying information where it will do the most good and, at the same time, breaking the chain of infection when the rewards are most promising. These measures, in capsule, comprise the responsibility of the practitioner in preventing the spread of tuberculosis today.

REHABILITATION

The third objective to be achieved is that of restoring the patient to full social and economic usefulness. Rehabilitation, according to the cliché, begins with the diagnosis of tuberculosis. The majority of patients today are in the higher age groups, which, in itself, presents many difficulties. In addition, many of our current patients have grave social and economic problems; a large number of them are alcoholics, yet we must meet the challenge. We must cope with the problems we understand, and we need to study those factors that we do not yet understand. We should learn a little more about the interactions of tuberculosis and the psyche and about those factors which intervene between patients and ourselves — factors which prevent our applying proper treatment. Despite decades of intensive educational effort on all levels, there is still the irregular discharge, the patient who will not accept therapy, and the patient whose psychic burdens may be even more staggering than his tuberculosis. Much social research is required to help us in our dilemma. As we see fewer patients with obvious tuberculosis, we see sicker patients with more complicated lives.

Rehabilitation was formerly regarded chiefly as vocational. Now we recognize that it is social and psychologic as well. If the patient is to have a thoracic operation which will greatly reduce his breathing reserve and possibly deform his thorax, he must be prepared physically by breathing exercises as well as psychologically as soon as the procedure has been planned. He must have not only the ability but also the will to resume earning his livelihood following discharge from the hospital. Most of us tend to take the disease, tuberculosis, for granted, little realizing that the patient seldom does. The patient's unexpressed fears may be the most important of all factors in determining whether he accepts treatment, rejoins his family on leaving the hospital, or goes back to work. He must be made as self-reliant as possible, because excessive dependency may well mark the tuberculous patient.

The practitioner should be aware of these complications when diagnosing tuberculosis. Many a "treatment failure" may have arisen because rehabilitation was not planned at the time of diagnosis. Corrective measures should not be "too little and too late" but should be prompt and vigorous.

SUMMARY

Although less obvious and less frequent than before, pulmonary tuberculosis still occurs with sufficient frequency to color the daily work of

every practitioner of medicine. A "treatment failure" represents our inability in a given instance to reach our 3 goals. To accomplish these objectives, each physician who sees a tuberculous patient—no matter how briefly—has a part to play and a responsibility to fill. The ultimate

in treatment has been attained when the patient has become a useful member of society, having been restored at least to the status he enjoyed before tuberculosis was diagnosed, and when he need no longer fear recurrence of the disease and others do not fear him.

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SINCE HOARSENESS is an occasional early symptom of cardiac decompensation, visualization of vocal cords should be done more frequently in cardiac diagnosis. A weak or paralyzed left vocal cord suggests increased pulmonary artery pressure.

Compression of the left recurrent laryngeal nerve is sometimes referred to as Ortner's syndrome. The term cardiovocal syndrome is preferable, as being more descriptive, for left laryngeal nerve palsy or paresis due to intrinsic heart disease rather than to such extrinsic lesions as aortic aneurysm or tumor.

Mitral stenosis is the associated cardiac lesion in most cases. Left laryngeal palsy has also been reported with congenital anomalies, such as atrial septal defect, patent ductus arteriosus, and Eisenmenger's complex, all accompanied by high pulmonary artery pressures. Left ventricular failure due to hypertensive heart disease or coronary artery disease has been implicated in several patients. Only 1 instance of vocal cord paralysis has been reported with essential pulmonary hypertension.

Since vocal cord paralysis is uncommon in mitral stenosis, dilation or upward displacement of the pulmonary artery is not the sole cause of the compression. Suggested ancillary factors are variation in attachment of the ductus arteriosus, lymphadenopathy in the aortic window, or stretching of the nerve after fixation at the aortic window.

The low percentage of vocal cord palsies reported with intrinsic heart disease may not reveal the actual frequency of the lesion, since partial or slow injury may produce no hoarseness.

HAROLD H. STOCKER, M.D., and H. T. ENTERLINE, M.D., University of Pennsylvania, Philadelphia. *Am. Heart J.* 56:51, 1958.

Overcoming Complacency in the Tuberculosis Eradication Program

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IN ORDER TO MORE CLEARLY UNDERSTAND and appreciate the present status of the cooperative state-federal tuberculosis eradication program, we should review its fundamentals. The original program was based on two principles: (1) to control tuberculosis to prevent its spread and (2) to eradicate the disease wherever it was found.

The following procedures for accomplishing this objective were rather simple:

1. All cattle were to be tuberculin tested.
2. All reactors were to be removed, slaughtered, and subjected to necropsy.
3. All infected premises were to be thoroughly cleaned and disinfected.
4. All movements were to be traced into and from the infected herd to determine where the infection originated and where it may have spread.

Diligent application of these procedures led to modified accreditation of all counties in the United States by 1940; that is, the incidence of infection was less than 0.5 per cent. We might refer to the 1940's as the golden era of decreased activities in the tuberculosis eradication program, which could be attributed to several factors, such as manpower shortage due to World War II and a growing complacency on the part of the public, industry, veterinarians, and regulatory workers.

Complacency may be defined as contentment and satisfaction—especially self-satisfaction—which, in this case, resulted in the destruction of enthusiasm, initiative, and inspiration so essential to successfully carry out the eradication effort.

Against the strenuous efforts of some, complacency progressively and effectively penetrated the program during the 1940's. Tuberculosis eradication was displaced in public, industrial, and professional circles from a position of pre-eminent concern to one of second-rate impor-

tance, due, in major part perhaps, to the great publicity given to so-called "Achievement Days" celebration when states were first designated as modified-accredited areas. While the status of modified accreditation was considered an essential milestone in reaching the objective of eradication, the importance attributed to having reached this status naturally led to a letdown. All of this stimulated popular acceptance of false concepts, which were that: (1) control measures were adequate; (2) an irreducible minimum had been reached in tuberculosis eradication, so that industry would have to live with a certain amount of bovine tuberculosis; (3) tuberculosis was a vanishing disease and no longer an economic problem; (4) victory had been won, and to continue pushing the eradication effort was a waste of time and money; (5) bovine tuberculosis as a public health hazard was nonexistent; and (6) the need for vigilance was gone and the pressures for vigorous action withdrawn.

RESULTS OF COMPLACENCY ON THE PROGRAM

Publicity. Tuberculosis was not listed for discussion at industry and professional meetings. News items pertaining to bovine tuberculosis were displaced almost completely.

Modified accreditation standards. The accreditation standards represented the best thinking on the part of research and regulatory workers and industry leaders on the procedures necessary to maintain accreditation and to make further progress in the eradication of the disease. These standards were not adhered to in many cases, and, instead of attempting to achieve strict compliance, there was a tendency to do as little as possible to retain the status.

Funds. Naturally decreased interest in eradication of bovine tuberculosis resulted in decreased funds—both state and federal—for the program.

Technics. Due to the belief that bovine tuberculosis was nonexistent, less attention was given to testing technics.

Tests versus postmortem examinations. There was a growing tendency to consider reactors that

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showed no gross lesions on postmortem examinations as being nontuberculous. More and more, postmortem examinations performed in connection with meat inspection were considered the final proof as to whether the animal was tuberculous.

Cleaning and disinfection. Less attention was paid to prompt and thorough cleaning and disinfecting of premises after removal of reactors.

Education. Veterinary schools gave little or no emphasis to the eradication program or to teaching proper testing technics. Public education relative to the needs and objectives of the program was discontinued.

Quarantine. Quarantines of infected premises were either not issued, ignored, or not enforced.

Infected herds. Many infected herds were not properly handled in regard to frequency of tests, handling of reactors, or release from further testing prior to having passed the required number of clean tests. This resulted in setting up new foci of infection through movements from the infected herds.

Immediate requirements for redirection of program. Everyone interested or associated with bovine tuberculosis eradication should obtain the facts concerning the disease and get them across to the livestock industry, the public, the veterinarians, and the regulatory workers. Every opportunity should be used to explain and demonstrate proper testing technics to assure uniformity among all veterinarians engaged in testing for tuberculosis. This can be achieved through work conferences of regulatory employees and demonstrations at the meetings of veterinary associations and by giving more attention to testing technics.

Renewed confidence in the tuberculin test is necessary. It has long been considered one of the most efficient and reliable biologic tests known in the field of both human and veterinary medicine. Where agents or factors other than bovine tuberculosis are causing an interference in the interpretation of the reaction to the tuberculin test, immediate studies—both field and

laboratory—should be initiated to identify the causative factor.

With the proper application of available technics and tracing procedures, we believe that bovine tuberculosis can be further reduced and that complete eradication is within the realm of possibility. However, we believe this accomplishment is possible only if the livestock industry, regulatory workers, and the veterinary profession set eradication as the objective and are willing to provide the support necessary to achieve this goal. The fullest cooperation and teamwork of all concerned are essential.

The proper attack. A positive approach to the problem is necessary. The job can be done. This must be believed and sold. Confidence must be re-established in the tuberculin test as the basis for determining the tuberculous status of the cattle. Uniform application of approved technics is essential. The approach to tuberculosis should be redirected and designed to achieve total eradication. Strict attention should be given to cleaning and disinfecting premises and to quarantine procedures and the proper handling of herds to eliminate the disease in the herd and prevent possible spread to other herds. Great attention should be given to the epidemiology of each focus of infection. Special projects should be undertaken to investigate the field of nonspecific sensitization, including tuberculosis in other species, and the agents causing the "so-called" skin lesions to determine what part they play in the tuberculosis eradication program.

Action is the key to overcoming complacency, which is the greatest obstacle in our road to bovine tuberculosis eradication. The veterinary profession and regulatory workers have responded in the past to the need for action in dealing with serious diseases of livestock of this country and have achieved complete eradication of dangerous, contagious pleuropneumonia, foot-and-mouth disease, and cattle fever ticks; and vesicular exanthema appears to have been eradicated. So why not add bovine tuberculosis to the list?

Tuberculosis in New Hampshire

ROBERT B. KERR, M.D.

Manchester, New Hampshire

AS THE VOLUNTARY MOVEMENT to eradicate tuberculosis in New Hampshire enters its forty-third year, it is fitting to take gratification in the dramatic decline in the tuberculosis death rate—a decline of more than 90 per cent since the foundation of the state tuberculosis association in 1916! It is a source of pride that the New Hampshire tuberculosis death rate continued to decline in 1957 and that our state maintains its position among the 10 states with the lowest tuberculosis death rate. New Hampshire has the lowest rate among all states east of the Mississippi River, despite the fact that, in proportion to its population, the state is the third most highly industrialized in the Union.

At the same time, however, tuberculosis maintains its status as the leading cause of death among the infectious diseases in New Hampshire. In the past ten-year period, tuberculosis took the lives of 6 times as many of the people of our state as were taken by all the other infectious diseases combined. Tuberculosis continues to be the most costly infectious disease in lives, in human suffering, and in financial losses to families and to the state.

The last annual report of our association carried this statement: "The people of New Hampshire had three goals when they started fighting tuberculosis through the founding of this association forty-one years ago. The three goals were to stop people from dying from tuberculosis, to stop people from getting sick with tuberculosis, and to stop people from becoming infected with tuberculosis germs." As has already been stated in this annual report, the people of New Hampshire have made noteworthy progress toward the elimination of tuberculosis as a cause of death among them. It would be a source of considerable gratification and of distinction if our state could be the first to eliminate tuberculosis as a cause of death among its people. But, the people

of New Hampshire will never be satisfied with the elimination of tuberculosis merely as a cause of death. They are determined to put an end to this preventable disease as a cause of long-term and costly sickness and, indeed, to put an end to tuberculous infection itself.

First of all, let us not underestimate the tubercle bacillus. It still has a tenacious hold upon the people of New Hampshire. This insidious, virulent germ is in the bodies of at least 15 per cent—perhaps 20 per cent—of our people at the present time. Upon the basis of 15 per cent, at least 74,000 harbor the germ. Clinical tuberculosis will not develop in the great majority of these people. But, the disease will take hold of some, and the germs will remain a potential hazard to the health and lives of all.

Today, 122 New Hampshire people are under treatment for active tuberculosis in hospitals, including the New Hampshire State Sanatorium at Glencliff and the Veterans Administration Hospital at Rutland Heights, Massachusetts. In addition, 88 persons with known active cases are under home treatment and supervision of private physicians, of physicians and nurses of this association, or of the state and local boards of health and visiting nursing associations. Our State Department of Health records 569 tuberculosis cases, arrested for less than five years, which are receiving active follow-up and necessary rechecks by the aforementioned professional workers. Such attention is given to arrested cases during the first five years because reactivation of tuberculosis often occurs during that period. Besides these 569 arrested cases, over 2,500 cases arrested more than five years are known to the clinics of the New Hampshire Tuberculosis Association. Some of these cases have been arrested ten, twenty, or thirty years or even longer. Though less vigilant follow-up is needed and infrequent check-ups are required for these patients with older arrested cases, their disease can and sometimes does become active again, requiring further treatment and supervision to prevent spread of their renewed infection to others.

In all cases of tuberculosis, check-ups must include those who have come into close contact with the infected person. Members of the vic-

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tim's household may catch the insidious tuberculosis germ and, after months or years, may themselves succumb to the disease. Thus, tuberculosis is transmitted by contact rather than by heredity.

New Hampshire is a pioneer in detection and eradication of tuberculosis through tuberculin tests in the schools. For two generations, the association has conducted tests among the entire school population. Each year, approximately 30,000 students receive the tuberculin test, so that, over the years, the entire school population has received it from time to time. In the current school year, 31,707 students and school personnel, including teachers, cafeteria workers, janitors, and bus drivers, were given tuberculin tests. Twenty-two per cent of the school personnel and 2 per cent of the students tested reacted—about the same percentage as in previous years. One hundred seventy-six children were placed under preventive care and supervision and 7 others under treatment for active lesions in a beginning stage. Every effort has been made to search out the people who have spread tubercle bacilli to these children. Naturally these "spreaders" are found among the adult contacts of the children. Finding them saves the children from repeated infection and, at the same time, allows opportunity for saving the lives of the "spreaders." As in previous years, the finding of several contagious pulmonary tuberculosis cases among the adult contacts has been the result of patient work in the 1957 and 1958 school program. The severe active tuberculosis cases found among students in the early years have been practically eliminated. However, approximately 2,900 of our school population are under supervision for healed tuberculosis infections and for arrested tuberculosis primary complexes. A much smaller number are under treatment for active tuberculosis primary complex. The foregoing figures on active and arrested cases of tuberculosis reveal that tuberculous lesions requiring supervision are known to exist in about 5,900 people, about 1 per cent of the population of New Hampshire.

Furthermore, despite the united efforts of our medical profession, our public health nurses, and our state and local departments of health and education and the state-wide campaign waged by the New Hampshire Tuberculosis Association, 120 new cases of tuberculosis were reported in 1957 and approximately the same number in each of the past three years. Of these new cases reported in 1957, approximately 80, or two-thirds, were detected through the association clinics. Though the number of new cases detected annually continues to be large, the number of signifi-

cantly ill persons among them is slowly diminishing. Also, the tuberculosis infection rate is declining rapidly, as we know from the decreasing percentage of those who react to the tuberculin tests in the schools. Most heartening is the low number of deaths caused by tuberculosis in New Hampshire in 1957—only 20, or 3.6 per 100,000 population.

However, the group of persons with tuberculosis who are under treatment and supervision increases steadily. There are more of these cases now than ever before, as early detection increases the number of persons with known active disease who require treatment and as their cases later become arrested and require supervision.

Both active and arrested cases pose problems. Some people with active disease place supreme reliance on the use of antituberculosis drugs and neglect other elements in treatment. Others become resistant to the drugs and may be harmed rather than benefited by their continued use. People with arrested cases must be persuaded to follow medical advice to prevent reactivation of the disease. And, though most people with known tuberculosis are cooperative, some few will not place themselves under medical care.

It is extremely gratifying that potent antituberculosis drugs and improvements in chest surgery have greatly reduced the former period of two to three years for treatment of tuberculosis in the sanatorium. Nowadays, many of our patients admitted to the sanatorium with advanced tuberculosis and with their sputum loaded with tubercle bacilli can be discharged after six to nine months with sputum and all other tests showing no tubercle bacilli and with their disease arrested. This reduced length of sanatorium treatment has made possible the closing of some of our smaller sanatoriums. Patients discharged from a sanatorium, however, must often continue taking drugs and need continued supervision and care. Our visiting nurses are serving such patients effectively and generously.

Besides using its resources for the detection, treatment, and supervision of tuberculosis among the people of New Hampshire, our association is contributing financially toward the solution of medical and social problems in the war against tuberculosis. A principal social problem is to discover unknown cases of tuberculosis. Altogether, the responsibilities and the work of the association are heavy. But, the burden is lightened by the wholehearted aid given by physicians, public health nurses, state and local boards of health and education, hospitals, volunteer workers, and the people of New Hampshire through their generous financial support.

The Tuberculin Test in Cattle

J. E. WILLIAMS, D.V.M., Ph.D.

Washington, D. C.

THE TUBERCULIN SKIN TEST has been used in detecting tuberculosis in cattle since 1890 when tuberculin was first prepared by Robert Koch. Its accuracy has stood the test of time and usage as one of our most reliable diagnostic reagents in animals. As early as March 31, 1892, Dr. Leonard Pearson tested a herd of cattle in Pennsylvania with tuberculin that he brought from Europe.

The former Bureau of Animal Industry undertook work on tuberculin in 1892 and began to supply it to state and federal veterinarians for field use. There was immediate interest in its application as a means of detecting tuberculosis, and the demand for it steadily grew. In the year ending June 30, 1906, about 100,000 doses were prepared and distributed. During the twelve-month period ending June 30, 1959, approximately 10,000,000 doses will have been prepared and distributed.

Along with the program to produce tuberculin for field distribution, a very active research program involving chemical and biologic studies of tuberculins was also undertaken very early by the former Bureau of Animal Industry of the United States Department of Agriculture. As this research work progressed over a period of many years, the Bureau was recognized as the foremost source of information relating to the production and testing of tuberculins in the United States. Most of the other laboratories working in this field in all parts of the world depended on the Bureau to provide them with standardized materials for checking and improving their own products.

Dr. Marion Dorset, former chief of the Biochemic Division of the Bureau of Animal Industry, first selected the three strains of *Mycobacterium tuberculosis* (Pn, C, and DT) that are now in world-wide use for the production of tuberculin for both animal and human use. Dr. Dorset isolated these cultures from tuberculous children in Washington, D. C., about 1903.

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Another significant contribution of the Bureau of Animal Industry was the development of a synthetic medium for the production of tuberculin in 1934. This medium provided a tuberculin of better specificity and purity than the original tuberculin produced on nonsynthetic mediums. In 1934, the preparation of the old type of tuberculin was discontinued in the United States, and the synthetic medium was accepted as the standard. Many other countries adopted the use of this medium as first developed by the Bureau of Animal Industry, and, at the present time, most tuberculins are produced on the synthetic medium of the former Bureau of Animal Industry.

Cultures are grown on this medium at a temperature of 37.5° C. for ten weeks. The average maximum weight of bacteria, which is usually reached before the end of the seventh week, is approximately 2 gm. (dry weight) per 100 cc. of medium. When the cultures have attained their full growth, they will have used up practically all the constituents of the medium. At the end of the growth period, the cultures are sterilized in flowing steam for three hours to kill the tubercle bacilli. After being cooled, the sterilized cultures are strained through gauze. The filtrate containing the active principle of tuberculin is evaporated to slightly less than one-fifth of the original volume of the culture medium. Glycerin and phenol are added in equal quantity, bringing the total volume to 40 per cent of the original volume of the culture medium. Finally, the product is filtered and passed through high speed centrifuges until clear and free of all traces of tubercle bacilli.

In 1955, after more than sixty years of experience in preparing various types of tuberculins, the Agricultural Research Service discontinued activity in this field. This action was necessary due to the lack of adequate facilities for working with tuberculosis cultures. Consequently, a commercial source of the product was developed through contract arrangements under which every stage of tuberculin production is constantly under close supervision by trained personnel of the United States Department of Agriculture. Each step to be followed is carefully checked,

and all the procedures used are those developed and used by the United States Department of Agriculture. Persons associated for many years with the Bureau of Animal Industry in the development and production of tuberculin presently serve as consultants in the production program and earlier provided the information on which are based manufacture and testing standards. If, at any time, questions arise regarding the production of tuberculin obtained from commercial sources, these consultants are available to discuss the problem, and their recommendations are closely followed. Agricultural Research Service personnel, who have spent many years working in this field, are also constantly available to provide advice regarding questions that arise in the fields of tuberculin production and evaluation. These practices have insured a product of highest quality and potency for use in field programs.

In addition to providing detailed specifications on the production of tuberculin, government supervision includes the use of specific biologic and chemical tests by both Agricultural Research Service laboratories at Beltsville, Maryland, and by the commercial firm before the product is released for distribution. The United States Department of Agriculture biologic tests include a comparison of the commercially developed product with a previously selected standard produced by Agricultural Research Service, using guinea pigs that have been sensitized with cultures of the tuberculosis organism. Test results with the Agricultural Research Service product must compare very closely with those obtained with the commercial product. All of the data derived from these sensitivity tests in guinea pigs are subjected to statistical analysis, and the final disposition of the tuberculin is dependent upon the results obtained. Chemical tests are also conducted to determine the total nitrogen in the product and the nitrogen precipitable by trichloroacetic acid. These determinations provide information on the amount of active principle in the product. Chemical tests also include those for the level of phenol in tuberculin and the determination of its hydrogen ion concentration.

It has been pointed out by those using tuberculin under field conditions that the commercial product is slightly less dark in color than was that distributed by the Agricultural Research Service prior to 1955. This difference in color

has no relationship to the potency or quality of the tuberculin and is due to the fact that the commercial producer prefers to filter the sugar solution before adding it to the culture medium used to make tuberculin. This procedure precludes the heating of the sugar and results in a lighter color of the finished product, since sugar upon exposure to heat becomes caramelized and a darker color is formed. It was the practice of Agricultural Research Service to add the sugar to the medium before heating it rather than to filter the solution before adding it to the medium. This matter was thoroughly considered at the time a contract was drawn up for tuberculin production, and it was determined that the addition of the unheated sugar would in no way alter the potency or quality of the finished tuberculin.

In an effort to develop more detailed information on factors causing reactions to tuberculin in no-gross-lesion cases under field conditions, the Animal Disease Eradication Division has established an investigational project on tuberculosis at the Ames Interim Diagnostic Laboratory. The program of this unit includes detailed laboratory studies of specimens collected from animals revealing no-gross-lesion reactions. It is hoped that this work will provide additional data on the cause of some of the no-gross-lesion problems occurring in the field. It is well known that, in the field of human tuberculosis, many new types of bacterial organisms closely resembling *Mycobacterium tuberculosis* are being recovered from patients thought to be tuberculous. In maintaining the confidence in the tuberculin test, which has been built up over a period of many years, it is important to acquire newer information on some of the causes of no-gross-lesion reactions as they are encountered in the field. With the establishment of the new Ames National Animal Disease Laboratory, work can be expanded on the experimental study of tissues derived from animals reacting to the tuberculosis test in the field.

The validity of the tuberculin test has been demonstrated by scientists in all parts of the world for many years. Our present tuberculin continues to provide us with one of the most valuable diagnostic agents available to man for the detection of disease. The high standards set for the product in the past will be continued in the future.



Solon Marx White, M.D.

*Physician, Educator, Administrator,
and Beneficent Friend of Humanity*

J. ARTHUR MYERS, M.D.

IT IS BOTH PLEASING AND INSPIRING to assemble and record data concerning the life and work of a physician whose contributions to the welfare of humanity have been so vast and have extended over such a long period of time as those of S. Marx White. All through life, he has frequently been asked about the name Marx. His father, Solon C. White, was very fond of his preceptor, Dr. Solon Marks, with whom he read medicine in Milwaukee in the 1860's. Therefore, when his young son was born in Hokah, Minnesota, on July 16, 1873, he was named after the preceptor. The spelling of the name Marks was simplified when its owner matriculated at the Illinois University. Marx's maternal grandfather, Thomas Armstrong, practiced medicine at Sandwich, Illinois, and died in 1886 at the age of 86. His father, Solon C. White, after reading medicine in Milwaukee, graduated from Rush Medical School in 1869.

When Marx was born, his father had temporarily left the practice of medicine and was in the milling business with his brothers at Hokah, Minnesota. The family moved to Illinois in 1883 where Marx graduated from the Sandwich high school in 1891. That fall he entered the University of Illinois, Champaign-Urbana. The institution was then known as the Illinois Industrial University, with slightly less than 800 students. In 1896, he received the degree of Bachelor of Science from the School of Natural History in that institution. Conferring of the degree was delayed until he completed a thesis on "Bacteria in Surgery." In the meantime, he was a student at Northwestern University Medical School, which he had entered in the fall of 1894. Immediately after receiving the degree of Doctor of Medicine from Northwestern University in 1897, he entered an

eighteen-month internship in Cook County Hospital, Chicago, following a competitive examination.

EARLY YEARS IN MEDICINE

On December 1, 1898, Dr. White was appointed "demonstrator" of pathology and bacteriology at the University of Minnesota Medical School, under the service of Dr. Frank Fairchild Westbrook. Soon, he became instructor and, in 1904, was promoted to the rank of assistant professor.

While in the Department of Pathology and Bacteriology, he initiated the autopsy service at the Minneapolis General Hospital. The morgue in which the autopsies were performed had been a stall for horses located in the barn attached to the palatial residence on the site of the present Minneapolis General Hospital. No stenographic service was provided, so his reports had to be written in longhand. Concerning them, he recently said, "With the heavy teaching service of the time, there are to be found a number of gaps in the big old ledger in which the autopsy reports were recorded by hand."

Dr. White has always had a far-reaching vision and has aimed at the highest goals. Therefore, while teaching pathology and bacteriology in 1904, he took six months for study with Professors Neusser, Holzknecht, and Haudek at the University of Vienna.

In 1908, he transferred to the Department of Medicine at the University of Minnesota with the title assistant professor under Charles Lyman Green, St. Paul, chief of the department. Two other outstanding young physicians in the department at the time were George D. Head and Henry L. Ulrich. The department was located in a rebuilt residence on Washington Avenue and State Street. This served as the beginning of the hospital for the Department

of Medicine. A similar rebuilt residence served as the start of the University Hospital for the Department of Surgery.

Dr. White's former chief of the Department of Pathology and Bacteriology had become dean of the School of Medicine, and he was the prime instigator in the effort to acquire that half of the campus which lies south of the Northrop Auditorium. Dr. White played a large role in the plans for Millard Hall and for Elliot Memorial Hospital.

His desire to possess the latest and best information for the benefit of his students caused him to spend another six months in Europe in 1914 at Allgemeines Krankenhaus and the University of Vienna and with Sir Thomas Lewis in London.

When he returned to Minnesota, he procured in 1915 the second electrocardiograph in the state and had it installed at Millard Hall. The first instrument of this kind had been installed at the Mayo Clinic in Rochester by Dr. Frederick Willius. No wonder Dr. White was promoted to full professorship in medicine in 1915. He became chief of the Department of Medicine in charge of the medical service at the University Hospital in 1921, giving more than half of his time to the school.

As chief, he took a special interest in the younger men on his staff and afforded them every possible opportunity in teaching and research. When senior medical students often asked his advice about entering a specialty or general practice, his answer usually was, "If you enter general practice, you will do well financially almost from the beginning. If you enter a specialty, you may have financial difficulty for the first year or so, but at the end of five years you should be well established." He then hastened to point out that financial consideration should never be given first place, but above all should be the service which the physician renders to others, whether it be in general practice or a specialty.

When young staff members inquired about the possibilities of promotion in rank, his answer was, "Work hard and produce results of such high quality that the faculty will be compelled to promote you." This was exactly what he himself had done.

His resignation as chief of the Department of Medicine in 1925 was lamented by the teaching staff and the student body. He resigned to allow the employment of a full-time director of the department and to devote more time to the Nicollet Clinic, which had been organized in 1921 and of which he was a founder, director, and chief of the Department of Medicine. Nevertheless, he retained the professorship and devoted considerable time to teaching at the University. Since 1942, he has been emeritus professor of medicine, always ready to respond to every call and contribute any desired service to the Medical School.

PERSONAL LIFE

Dr. White's family life has had a considerable influence on his career. He married his high school sweetheart, Sara Abbott, in July 1900. Their first

child, Asher Abbott White, was born in August 1901. The two daughters, Elizabeth Ann and Mary Grace, were born in March 1903 and December 1906, respectively. From the time of her third delivery, Mrs. White was found to have an unstable heart rhythm with recurrent episodes of auricular fibrillation. This fact influenced Dr. White to center his interest in cardiology. Sara lived to see all 3 of her children married but passed away in the spring of 1931 from complications of her cardiac condition. Dr. White thus had thirty-one years of supremely happy married life.

Following Sara's death, Dr. White lived alone in the home near the University Hospital in which he and Sara had reared their family. His interest in affairs about him was undiminished, but the period was bleak for him emotionally. After several years of living as a widower, an old friendship was renewed with a widow whose husband had died shortly after the death of Sara White. This was Mrs. Beulah Fuller. The Fuller family, the Marx White family, and several other well-known Minneapolis families had been very close for many years, calling themselves "The Old Crowd" and picnicking together and many of them spending summers together at their respective summer places on the Minnesota River. In January 1944, Marx and Beulah Fuller were married, an association which, for both of them, has proved to be as beautiful a relationship as their first marriages had been. This second marriage has been a great factor in Dr. White's continuing energies and breadth of interests.

Important among these interests are his grandchildren and great grandchildren. Of grandchildren, he has 5 who belong to his youngest daughter, now Mrs. J. L. Coffield, Jr., of Wilmette, Illinois. The older daughter, Mrs. Herbert W. Rogers, of Maplewoods, Wayzata, has 2 children, and his son, Dr. Asher A. White, has 3 children. Each of these families in turn have grandchildren. Dr. White's great grandchildren as of 1959 number 4. Through Beulah White's son, Robert G. Fuller, of New York, there are 2 more in the fourth generation.

Medical influences are far reaching in Dr. White's family, he himself being the third generation of physicians. Dr. White's son is a physician, and, in the son's family, 1 boy, Asher White, Jr., is at present preparing himself for entry into medical school. One nephew and 2 grandnephews are physicians.

ACCOMPLISHMENTS

Throughout the years, Dr. White's teaching has had an exceedingly valuable influence in promoting and establishing good medicine in Minnesota. His primary interest has continued in diseases of the chest and, especially, in those of the heart.

He was 1 of 3 physicians who developed the first organization to combat tuberculosis in Minneapolis. The other 2 were Henry L. Ulrich and Lester Day. They constituted a committee appointed by the Young Men's Medical Club, which was in existence prior to 1903. Throughout the fifty-six years that

have elapsed, Dr. White has had an abiding interest in tuberculosis eradication and has played an important role not only in teaching the pathology and bacteriology but also clinical aspects of the disease.

In 1920, he was appointed to membership on the Hennepin County Sanatorium Commission where he was influential in the development of the Glen Lake Sanatorium. Indeed, he had a guiding hand in establishing and maintaining the high medical standards which have so long characterized that institution. In 1943, he was elected president of the Sanatorium Commission and served in that capacity until he resigned in 1956.

Dr. White has been a member of the National Tuberculosis Association since it was founded in 1904. He was secretary of the Laboratory Section during 1905 and 1906 and has retained membership throughout the years. He has long been a member of the board of directors of the Hennepin County Tuberculosis Association and has also been president.

In January 1957, he published an editorial in *THE JOURNAL-LANCET* entitled "A Challenge." This was so all inclusive with reference to the latest information concerning tuberculosis that it attracted national attention. In fact, it was summarized and published in *Tuberculosis Abstracts*, issued by the National Tuberculosis Association, a publication that reaches the desks of thousands of physicians throughout the United States. In this article, he pointed out that "tuberculosis is still a scourge despite modern drugs and excisional therapy."

In February 1959, an editorial entitled "Vacant Sanatorium Beds" was prepared by Dr. White and published anonymously in *THE JOURNAL-LANCET*. This revealed his broad and comprehensive grasp of the tremendous tuberculosis problem which still requires solution.

In 1956, the famous William P. Shepard, New York City, said, "When my professor of medicine, Dr. S. Marx White—a great physician and a revered teacher, still of lively memory and still possessor of remarkable wisdom in the healing art—first commenced to practice medicine, tuberculosis took the lives of nearly 200 per 100,000 population each year, a death rate nearly 20 times that of today!" The mortality from tuberculosis in the United States has dropped from well nigh 200 per 100,000 population, when Dr. White began his professional career, to less than 8 per 100,000. When Dr. White joined the faculty of the Minnesota School of Medicine in 1898, the tuberculosis mortality rate in this state was 102.5 per 100,000. He saw the rate rise to 119.7 in 1911. From that time on, he contributed significantly to the decline of the mortality rate to approximately 3 per 100,000 in 1957.

MEDICAL AFFILIATIONS

He has always appreciated the value and importance of the official health agency, the Minnesota State Board of Health, and served as a member of this board from 1919 to 1931. From 1926 to 1929, he was president, and, from 1921 to 1924, he served

on the Minnesota Advisory Commission for Consumptives. He served as president of the Minnesota Academy of Medicine in 1909. He was an early diplomate of the American Board of Internal Medicine and is a long-time fellow of the American College of Physicians, which he served as regent from 1926 to 1935 and as president in 1931 and 1932.

He is a member of the Association of American Physicians, the American Heart Association, and Central Interurban Clinical Club and honorary member of the Pacific Interurban Clinical Club since 1932, the Central Society of Clinical Investigation, the Institute of Medicine of Chicago, and the Chicago Historical Society.

Dr. White has long held membership in the Hennepin County Medical Society, the Minnesota State Medical Association, and the American Medical Association. He was president of the Minnesota Society of Internal Medicine in 1931 and 1932 and a member of the Minneapolis Society of Internal Medicine since it was founded and served as president in 1950 and 1951.

He is a member of Nu Sigma Nu and Alpha Omega Alpha fraternities.

In World War I, Dr. White volunteered for service and was in charge of the Division of Medicine, Base Hospital No. 26. He served as major in the Medical Corps of the United States Army, American Expeditionary Forces, Base Hospital No. 26 in 1918 and was lieutenant colonel in the Medical Reserve Corps from 1919 to 1939.

Dr. White has never worked by the clock but always until the job was done. His work has brought greatly merited respect of the entire citizenry of Minneapolis as manifested by his election to the presidency of the Community Chest and Council in Hennepin County from 1932 to 1935 and by being the recipient of the award for distinguished community service in 1951, the award of the St. Barnabas Bowl for distinguished service to medicine by Hennepin County Medical Society in 1952, and the Francis Harrington award for distinguished service in public health in 1955.

Dr. White has seen all of the marvelous developments in the field of health in the twentieth century to date. Indeed, he was teaching pathology and bacteriology when antitoxins for diphtheria and tetanus were being developed. He successfully treated the first case in Minnesota in which Flexner's serum for epidemic cerebrospinal meningitis was used, driving daily with horse and buggy to a home 15 miles away and returning in time for his classes. From year to year and decade to decade, he has kept abreast of the advances and has readily accepted, taught, and used all which had unquestioned value. He has personally treated thousands of women and men by the best known methods of the time. Today he enjoys a superior reputation and is in demand not only by private patients themselves but also by many physicians who seek his consultation. Thus, he has attained the high goals toward which he aimed throughout his professional life.

Dr. White was my teacher and later my chief in the Department of Medicine. During the third of a century that has followed, he has continued as a revered friend. Undoubtedly, thousands of physicians now engaged in practice, teaching, research,

and other medical activities in Minnesota and various parts of the nation join me in expressing our deep indebtedness to Dr. White for his teaching and encouragement and for the other fine influences he has had on our lives.

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Anatomy for Surgeons, by W. HENRY HOLLINSHEAD, Ph.D., 1958. New York: Paul B. Hoeber, Inc., Vol. 3. \$23.50.

This is a third volume of a comprehensive series by the same author. The author has for many years delighted the graduate students in orthopedic surgery at the Mayo Clinic with his excellent lectures in functional anatomy of the extremities and back. The volume presents these concepts in a very readable and reasonably concise manner. It is a volume which will require study, for anatomy cannot be presented in any other manner. It is comprehensive, and it fills a much needed gap in the surgeon's library.

This is a volume replete with anatomic data and with much reference to the clinical application thereof. Data contained therein



relative to anatomic variations may seem, at times, slightly excessive, but one has only to read on a page or two to again become engrossed in applicable, surgical, and anatomic material which is essential knowledge to the orthopedic surgeon or to any surgeon working in the extremities or on the back.

The book is very readable and is well documented with references.

The student who is particularly interested in the concentrated study of a muscle or a nerve may find that careful study of several sections of this book will be required in order to complete his review, for the book is divided into sections which stop short at various levels of the extremities. This is not, however, a real fault, for all of the information desired is readily available.

It is a fine book for students, teachers, clinicians, and surgeons. The data contained within its pages are not readily obtainable without wide reading elsewhere. It is a book which should occupy a place beside the standard textbooks on anatomy and should be a part of the library of the medical student, intern, resident, or surgeon. Perhaps the basic criticism which will be expressed may be that the illus-

(Continued on page 23A)

New Horizons for the Tuberculin Test

ALTHOUGH THE TUBERCULIN TEST has always had an important place in the diagnosis and control of tuberculosis, recent developments indicate that the test will be even more useful in the decades just ahead. The tuberculosis mortality rate has shown a remarkable drop in the past ten years, followed by a slower decline in the tuberculosis case rate. An even more significant change in the United States is the diminishing risk of acquiring new infections. In certain areas of the nation, particularly in the Northwest, entire school populations are tuberculin negative. Results of tuberculin testing in Navy recruits provide a broad view for the United States as a whole. In 1950, 9 per cent of white recruits were classified as tuberculin reactors. Only seven years later, the proportion of reactors had decreased by one-third. The implication of such findings, substantiated by tuberculin testing programs in various parts of the country, is that new infections with virulent tubercle bacilli must be approaching the low figure of 1 per 1,000 persons per year.

The complacent attitude, once widely held, that tuberculous infection is an inevitable consequence of adulthood is now outmoded, as is the concept that positive reactors are immune and not likely to develop tuberculous disease in the future. Indeed, current findings demonstrate that most new cases of tuberculosis occur in persons who were infected many years ago. This situation points up the significance of a positive reaction to tuberculin as an indicator of substantial disease risk and emphasizes the necessity to identify the tuberculin reactors, thus delineating the areas and groups where tuberculosis control efforts can be most effectively applied.

The dramatic change in the tuberculosis infection rate and the constantly diminishing proportion of positive reactors in the population have important implications for medical and public health practice. In differential diagnosis, the pediatrician is no longer the only advocate of tuberculin testing. Now that many adults are negative reactors, the tuberculin test should be a routine part of every examination when pulmonary pathology is suspected.

The method of choice in administering tuberculin is the intracutaneous (Mantoux) test. Indeed, it has been well established in numerous trials that a Mantoux test with a dose of tuberculin equivalent to 0.0001 mg. of the international standard purified protein derivative (PPD-S) will produce a reaction in practically all cases of proved tuberculosis with a minimum of false negatives. It is customary in

interpreting the test to regard reactions of 6 mm. or more of induration as positive. There is now some evidence, however, that a better dividing point might be 8 or 10 mm., since almost all persons with tuberculosis have reactions this size or larger, and smaller reactions may be nonspecific.

Properly administered and interpreted, the tuberculin test can promptly rule out the tubercle bacillus as the etiologic agent in many instances and allow a more diligent and fruitful search for tuberculosis in positive reactors. Wider use of this readily available and inexpensive test should result in a considerable saving of time and money to both patient and physician. The need for the patient to return for a reading of his test may well be a blessing in disguise. All too often, patients with serious pulmonary pathology have only the symptoms and signs of a superimposed acute infection. Obtaining temporary relief, they see no need for a return visit until the underlying disease has become manifest. A test to be read three days later might improve the follow-up of chest diseases seen in office practice.

The continued decline in the proportion of reactors in the population will also increase the usefulness of the tuberculin test for tuberculosis case finding in various community groups. Numerous studies have shown that tuberculosis is heavily concentrated among reactors to tuberculin, particularly among those with the strongest reactions. In many groups, it is already feasible to offer chest x-rays and other diagnostic procedures only to the small group of positive reactors.

With therapeutic agents that can reverse the infectiousness of nearly all cases, with adequate facilities for isolation, with the help of the tuberculin test to concentrate diagnostic case finding, and with therapeutic efforts applied where they will be most effective, the odds against the tubercle bacillus now are greater than ever before. In most areas of the United States today, it should be possible to set our sights not merely toward the control of tuberculosis but toward its eradication. As this goal is approached, the identification of the small minority of the population among whom infection still persists will become increasingly important. The tuberculin test can already perform this function with considerable precision, and recent studies indicate that even better testing products and techniques will shortly become available.

Reprinted from the *Journal of the American Medical Association*, 168:894, 1958, with permission of the editor.

BOOK REVIEWS

(Continued from page 217)

trations showing individual muscles and muscle groups are rather too diagrammatic and are not often accompanied by illustrations of anatomic dissections and skeletal illustrations depicting origins and insertions of muscles. It is best, therefore, to read this volume in conjunction with an open atlas of good anatomic illustrations.

JOHN H. MOE, M.D.

Cardiac Arrest and Resuscitation, by HUGH E. STEPHENSON, JR., M.D., 1958. St. Louis: C. V. Mosby Co. \$12.00.

To be sure, this is a book upon a specialized, although important, subject, but it is a gem. One is almost stunned when one reflects on the amount of effort, study, and dedication that have been put into the writing and production of this book. Certain adjectives occur to the reader as he peruses the book: authoritative, genuine, unimpeachable, definitive, sterling, irrefutable, conclusive, and, above all, useful. The reviewer is in complete agreement with the words of Dr. R. S. Dismore's introduction, "Historians of

the subject will have to begin where he left off, because it is complete as of now and will save these investigators countless hours of tedious work." The author initiated and kept singlehanded over a period of years a registry of these cases, and 1,700 have been collected. Their analysis forms part of the basis of this book. The references given in the bibliography approximate 2,000. Here is no hastily conceived, superficial work but an endeavor representing extensive experience and mature reflection. The style in which it is written, while not brilliant, is adequate and readable. It is a rare joy to see a work so solidly worthwhile.

Every conceivable aspect of the problem is covered. Theoretic considerations are exhaustively (but not exhaustingly) presented. The chapters on diagnosis, management, and complications are clear, detailed, and thoroughly practical and usable. This book contains all that one needs to know on this subject and much more. It is very enthusiastically recommended. It should be available to all as a reference work, and many will wish to have it for their own libraries.

JOHN H. ROSENOW, M.D.

Host-Parasite Relationships in Living Cells, a symposium sponsored by the James W. McLaughlin Fellowship Program, University of Texas—Medical Branch, Galveston; compiled and edited by HARRIET M. FELTON, M.D., 1957. Springfield, Illinois: Charles C. Thomas, 245 pages, 66 figures, and 2 tables. \$6.50.

This book records a symposium of 8 "keynote" papers formally presented to stimulate thought, each followed by informal discussion. The symposium was concluded by a panel discussion to consider previously introduced concepts in the light of methodologic limitations for purposes of integration and indication of future investigation. Participants in the symposium were comprised of noted researchers from the East, West, Midwest, and southern United States, who collectively represented morphologic, biochemical, and biologic approaches to the study of host-parasite relationships. This symposium illustrates scientists' increasing recognition of the value of periodic conferences to summarize and integrate knowledge and is further evidence of the approaching maturity of biology in emphasizing

(Continued on page 26A)

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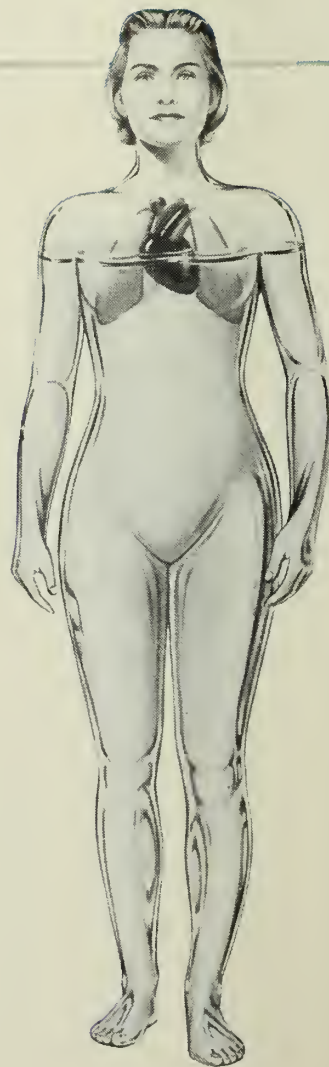
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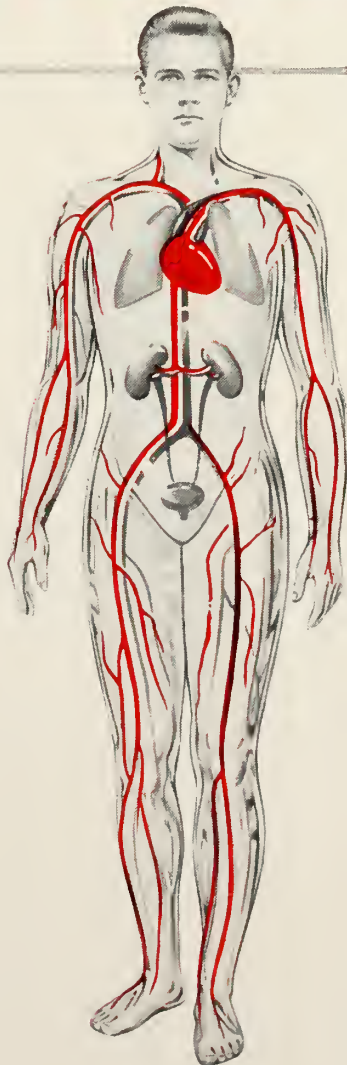
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BOOK REVIEWS

(Continued from page 23A)

synthetic as well as analytic concepts. Primary topics were chosen to stress key aspects of the structural and biochemical interrelationships of microbial parasitism and of the mutual resistance between host and parasite. The symposium was divided into two sections preceding the final integration:

1. A session on materials and methods, which, by virtue of text and illustration, provided concise pictures of (a) the architecture of animal and bacterial cells and viruses (Dempsey and Georgi), (b) disease induced by animal viruses at the cellular level (Syverton), and (c) host-parasite interaction as competitive physiologic activity (Hanks).

2. A session on current concepts which dealt with (a) the combined morphologic biologic approach to animal host immunity and hypersensitivity, including clinical study of human disturbances of gamma globulin metabolism (Good), (b) immunity factors in infection of cells by viruses (Dulbecco), (c) the metabolic view of parasitism (Dubos), and (d) mechanisms and molecular bases of the struggle between host and parasite (Sevag). Prefatory discussions by C. M. Pomerat serve to orient the reader to the tenor of the conference.

The value of the book is increased by the inclusion of extensive bibliographies. Transcripts of the conference purposely were edited to a minimum extent to preserve the flavor of the discussion. As a result, the text is marred by typographic errors. The nonspecialized reader will enjoy the record for its summary of information, its review of the modern concept of cellular disease, but mostly perhaps, for its revelation of the personalities and modes of thought of noted students of the infectious process. The book will interest specialized readers for obvious reasons. It is recommended particularly to cell culturists for the plates illustrating various types of virus-induced cytopathogenic effects.

JOHN D. ROSS, M.D.

•
Treatment in Internal Medicine, by HAROLD T. HYMAN, M.D., 1958. Philadelphia: J. B. Lippincott Co., 609 pages, illustrated. \$12.50.

This splendid volume is written by a man who has a remarkable gift of gathering together in one place an enormous amount of useful information. Somehow he manages the ex-

tremely difficult task of keeping his material right up-to-date. He writes interestingly, briefly, and to the point. Helpful is his scheme of dividing the treatment of many diseases into several classifications. First, a preliminary tentative treatment may be given before the doctor has time to make a thorough examination. For instance, a child may be seen one night with a sore throat and a little fever and malaise. The physician may give a mild sedative and, next day, perhaps, the child will be almost well. If, however, the child is worse the next day, the doctor will make a careful examination and prescribe treatment. A few days later, when the child either contracts a streptococcal sore throat or measles or diphtheria, other forms of treatment will be prescribed. Dr. Hyman describes the way medicine is really practiced by the busy physician.

WALTER C. ALVAREZ, M.D.

•
Anomalies of Intestinal Rotation and Fixation, by ROBERTO L. ESTRADA, M.D., Springfield, Illinois: Charles C Thomas, 161 pages. \$6.50.

This monograph presents an account of normal and abnormal rotation and fixation of the intestine in the fetus and correlates the symptoms in patients with the diagnosis and treatment of each anomaly.

The book is divided into 2 main parts. Part 1 deals with the embryologic aspects of anomalies of intestinal rotation and fixation. It takes advantage of the fact that the peritoneal relations in the adult cat are similar to those in the human embryo, as pointed out by Huntington in 1903. Accordingly, normal and abnormal rotations are depicted in a series of drawings which were prepared from cats by medical artists, Miss Mary Gzowski and Miss Eleanor Swezey. Although such drawings bring out effectively the normal and abnormal rotations, they are not adequate to illustrate the manner of fixation of the developing gut to the body wall. The origin of the omental bursa is considered briefly, and the origin of the infracardiac bursa is mentioned without citing Broman's famous monograph, *Die Bursa omentalis*. The subject of fixation of the gut covers 4 pages, 1 of which presents drawings of 6 anomalies in adult patients.

Part 2 is on clinical and surgical aspects of anomalies of intestinal

rotation and fixation. It includes 29 "case reports," most of which are accompanied by illustrations.

The book has a summary covering 4 pages, a list of 219 references, an author index of 7 pages, and a subject index of 14 pages.

The monograph should be more useful to internists, radiologists, and surgeons than to embryologists and other anatomists.

LEMEN J. WELLS, M.D.

•
Pediatric Methods and Standards, by FRED H. HARVIE, M.D., ed. 3, 1958. Philadelphia: Lee & Febiger. \$4.50.

Each year a new handbook of practical pediatrics appears. Each of these new additions or revisions presents from a tremendous volume of pediatric knowledge information that is most essential for the everyday practical care of infants and children. Each author extracts aspects of the subject which he feels are most important. This book has most successfully attained this objective.

Emphasis is on the presentation of accurate standards regarding most, if not all, phases of practical pediatric care. The manual contains standards on growth and development, metabolism, nutrition, hematology, endocrinology, neurology, bacteriology, and immunology as well as the biochemical values for composition of body fluids in regard to their needs in the growing child. There are also standards of reference to certain physiologic functions in the infant and growing child, which include functions of the gastrointestinal tract, cardiac function, and renal function. An excellent brief outline with diagnostic and therapeutic data on poisons is also presented. Of particular value is an adequate list of the newer antibiotic preparations, their methods of administration, dose schedules, toxicity, and appropriate indications.

This book is a must for all medical students as they approach the clinical field of pediatrics. A conscientious rotating or straight pediatric intern would find it difficult to care for his patients effectively without a reference handbook on standards, such as are presented in this handbook. The general practitioner who has considerable opportunity to care for infants and children will find frequent use for this handbook. The standards presented are among the most accurate and reliable that are available today.

JOHN A. ANDERSON, M.D.

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Zier, A. and Doshay, L. J.: Procyclidine Hydrochloride (Kemadrin) Treatment of Parkinsonism in 108 Patients, *Neurology* (July) 1957.

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Lerner, P. F.: Kemadrin, a New Drug for Treatment of Parkinsonian Disease, *J. Nerv. & Ment. Dis.* 123:79 (Jan.) 1956.

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News Briefs . . .

North Dakota

TEN PEDIATRICIANS from throughout the state attended the annual meeting of the North Dakota chapter of the American Academy of Pediatrics which was held recently in Bismarck. Doctors who attended were: L. G. Pray, Wayne LeBien, Chris Christu, and William Armstrong, all of Fargo; James Miles, Jamestown; Richard Dornmont, Minot; Lewis Silverman, Grand Forks; Gene Garrett, H. P. Smeenk, and Robert Tudor, all of Bismarck. Among matters discussed were the establishment, maintenance, and operation of poison control centers. The Academy has been one of the chief forces behind the formation of these centers throughout North Dakota.

• • • •

DR. PETER FUGELSO, of Minot, who is serving his internship at Tripler Army Hospital, Honolulu, has been accepted for a four-year fellowship in surgery at the Mayo Clinic. After completing his fellowship, which will begin in October, Dr. Fugelso will serve for four years as a physician with the Army.

• • • •

DR. JOHN G. FREEMAN, head psychiatrist at the Jamestown State Hospital since 1953 and assistant superintendent for the last year, will be acting superintendent until a permanent successor is appointed. Former superintendent, Dr. R. O. Saxvik, has resigned and is taking graduate work in psychiatry in Omaha.

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DR. WESLEY E. LEVI, who recently completed a three-year residency in pediatric radiology and radium therapy, has joined the staff of the Quain and Ramstad Clinic, Bismarck. After graduating from Temple School of Medicine in Philadelphia, Dr. Levi served two and one-half years in the Navy and then established practice in Omaha. From 1950 to 1955, Dr. Levi practiced in Beulah.

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DR. HENRY C. KRAHN, a graduate of the University of Manitoba in Winnipeg, is expected to establish practice in Wallhalla about June 1. Currently, Dr. Krahn is practicing in Edmore.

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DR. PAUL V. ADAMS, who has practiced in Langdon since 1953, will leave in June for four years of postgraduate study in obstetrics and gynecology at Winnipeg General Hospital. In addition to his general practice, Dr. Adams has been health officer for Cavalier County in the Lake Region public health unit since January 1956 and chief of staff at St. Mary's Hospital in Langdon.

Minnesota

TEN MINNESOTA MEDICAL SCIENTISTS have been awarded fellowships totaling \$114,000 for heart and blood vessel disease studies. The awards represent the first part of the 1959-1960 national research program sponsored by the American Heart Association and affiliated state associations. Recipients are: Drs. Richard A. DeWall, Anas-

tasius Dontas, Victor Lorber, Edward Ronwin, Alan P. Thal, Naip Tuna, Robert L. Vernier, Lewis W. Wannamaker, and Warren J. Warwick, all of the University of Minnesota; and James J. Peifer, Hormel Institute, Austin.

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DR. GILES A. KOELSCHIE, consultant in medicine at the Mayo Clinic and assistant professor of medicine in the Mayo Foundation, has been named president-elect of the American College of Allergists.

• • • •

DR. JOHN S. LUNDY, of the Section of Anesthesiology of the Mayo Clinic and professor of anesthesiology in the Mayo Foundation, opened the first annual Florida Medical Forum at Fort Myers, Florida, in March. Dr. Lundy also spoke on three other occasions during the three-day meeting. The first two days were open to the public, and the program was designed to acquaint the public with such problems as radioactive fallout, space medicine, treatment of shock by giving blood, Air Force missile work, and radioactive isotopes. The third day was open only to members of medical and allied professions and the professional aspects of the subjects discussed the first two days were considered.

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DR. WALTMAN WALTERS, head of a Section of General Surgery at the Mayo Clinic and professor of surgery in the Mayo Foundation, has left for an extended vacation trip to the Orient. During the course of the journey, Dr. Walters will speak at Tripler Army Hospital in Hawaii and address the General Assembly of the Japanese Medical Congress in Tokyo. He will also visit various United States Naval hospitals in Japan. In Hong Kong, Dr. Walters will speak before the Hong Kong Chinese Medical Society.

• • • •

DR. DALE BERGESON, graduate of the University of Minnesota Medical School, has become associated in practice with Dr. Donald Limbeck in Le Sueur. Dr. Bergeson took postgraduate training at Letterman Army Hospital, San Francisco, and recently completed three years of service with the Army at the United States Army Hospital, West Point, New York.

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DR. NORMAN L. HAGBERG, who is currently completing training at Immanuel Hospital in Omaha, is expected to join the Montevideo Clinic in July. At present, physicians on the staff of the clinic are William A. Owens, L. R. Lima, and R. W. Barr.

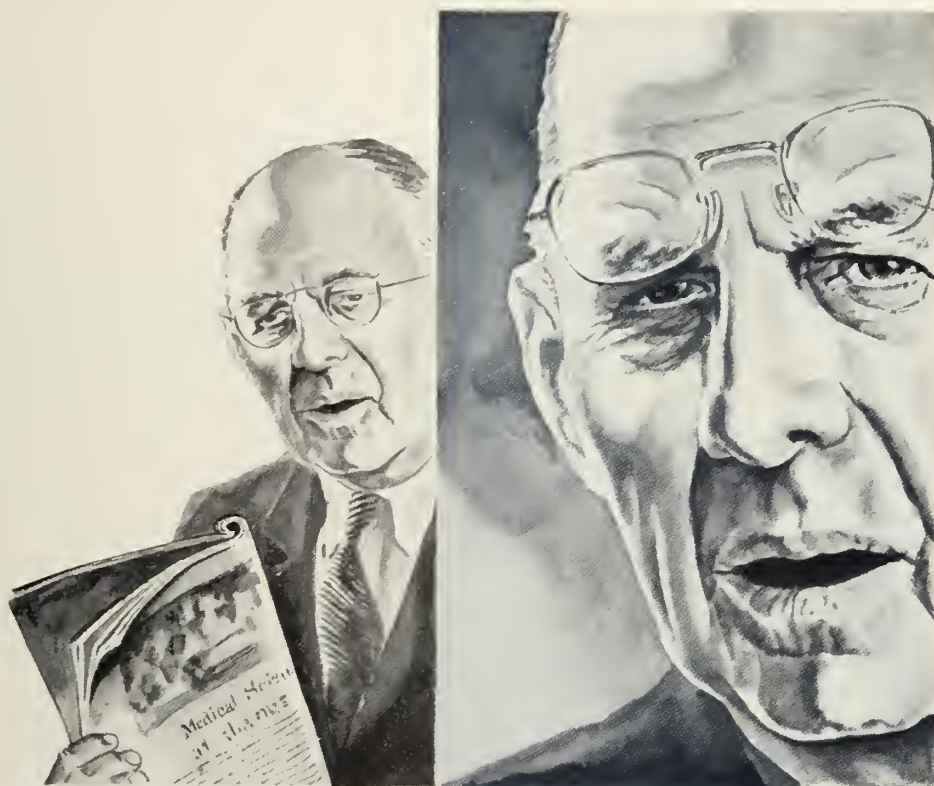
South Dakota

RECENT DEDICATION CEREMONIES formally opened the new clinic at Red Scaffold on the Cheyenne River Reservation. The new, modern clinic will make it possible for the Public Health Service to provide more adequate health services to residents of communities on the west end of the reservation.

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DR. LOREN H. AMUNDSON, who is presently serving as captain in the medical corps of the United States Army at the Army Hospital in Fort Hood, Texas, is expected

(Continued on page 30A)



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NEWS BRIEFS

(Continued from page 28A)

to join the staff of the Peabody Clinic in Webster upon his discharge in July. A graduate of the University of South Dakota and the University of Wisconsin Medical School, Dr. Amundson interned at Miller Hospital, St. Paul.

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DR. WAYNE SHAW, who recently completed a residency in surgery at the Baptist Memorial Hospital in Memphis, Tennessee, has become associated with Dr. John McCann in the McCann Clinic at Parkston. A graduate of the University of Louisville School of Medicine, Dr. Shaw interned at the University of Nebraska Hospital in Omaha and took postgraduate work in internal medicine at the Eastland Clinic, Eastland, Texas.

Deaths . . .

DR. CHARLES H. DUToIT, 42, a native of Minneapolis, was killed March 25 in an automobile accident near Boston. A graduate of Harvard Medical School, Dr. DuToit was on the staff of the Massachusetts General Hospital in Boston. He was well known as an authority on hypertension.

• • • •

DR. CARL J. LUCKEMEYER, 41, recently stricken with a heart attack, died March 13 in St. Cloud, Minnesota. At the time of his death, Dr. Luckemeyer was president-elect of the staff of the St. Cloud Hospital.

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DR. J. J. MCGROARTY, 79, a physician in Easton, Minnesota, for many years, died April 6 in the hospital in Wells, Minnesota, of a heart ailment. Dr. McGroarty had been Easton's only physician for the past fifty years.

• • • •

DR. A. G. MAERCKLEIN, 81, a physician and surgeon in Ellendale, North Dakota, for more than fifty years, died March 16. Dr. Maercklein was superintendent of health for Dickey County for many years and medical examiner for the draft board during World War I. He had been in semi-retirement for the past eight years.

• • • •

DR. GEORGE MONTEITH, 72, who had practiced medicine in Hazelton, North Dakota, for forty-three years, died February 26 in Eugene, Oregon. In addition to his practice in Hazelton, Dr. Monteith served the communities of Braddock, Robinson, and Steele. He retired in 1950 because of ill health, and, since 1954, the Monteiths have been living in Eugene, Oregon.

• • • •

DR. CHARLES OLSON, 71, St. Paul physician, died March 17 apparently of a heart attack while eating dinner. A former report that he had choked to death on a piece of steak was said to be untrue. On a previous occasion, Dr. Olson's life was saved by his son who performed an emergency tracheotomy with a paring knife after his father had choked on a piece of ham.

COMING in *July* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- A case of a patient with a left-sided lobe of the azygos vein is reported by William L. Walls, M.D., of Miami, Florida, in his paper "Lobe of the Azygos Vein Occurring on the Left." The diagnosis was suggested by routine chest films and was confirmed by laminagraphy.

- R. Lee Clark, Jr., M.D., Richard G. Martin, M.D., and E. C. White, M.D., of Houston, Texas, present "A Critical Review of the Management of Soft-Tissue Sarcomas." The article is based on the author's experience in treating 169 patients with various types of soft-tissue tumors. Among the different types discussed are fibrosarcomas, liposarcomas, synovial sarcomas, rhabdomyosarcomas, leiomyosarcomas, angiosarcomas, myxosarcomas, and some unclassified tumors.

- The differential diagnosis of aphasia is a complex process requiring the services of many different professional disciplines. This fact is emphasized by Nancy E. Wood, Ph.D., of Cleveland, Ohio, in her article "The Child with Aphasia." Differentiating factors are discussed, and the educational needs of the aphasic child are considered.

- In the series on communicable diseases, the late Erling S. Platou, M.D., of Minneapolis, and Laurence G. Pray, M.D., of Fargo, discuss "Diphtheria." Although the incidence and mortality of this disease have been reduced tremendously since the introduction of toxin-antitoxin mixtures and toxoid, about 2,000 cases still occur each year in this country. The mortality rate is 4 or 5 per cent. If mortality is to be reduced still further, diphtheria must be recognized and treated promptly. Rigid isolation of patients and carriers is also an essential requirement.

- "A review of the Orthopedic Literature for 1957" is the title of the article appearing in the series on fractures by Norman W. Hoover, M.D., and C. Roger Sullivan, M.D., of the Mayo Clinic. In preparing their review, the authors examined more than 500 papers, from which they selected material on the basis of general interest or innovation of concept or fact. Amputations and prostheses, bone grafting and tissue transplantation, various types of fractures, and surgery of the joints, spinal column, and peripheral nerves are some of the subjects discussed.

Meetings and Announcements

UNIVERSITY OF MINNESOTA
MEDICAL CONTINUATION COURSE
June 15-17—Gynecology for General Physicians

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

REFRESHER COURSE IN HAWAII

Because of the success of last year's postgraduate course, the University of Southern California is offering another course in Hawaii and on board the S.S. Lurline from July 29 through August 15. In addition to lectures, workshops will be held in ECG and x-ray interpretation and in problems of water and electrolyte balance and the diagnosis of jaundice. For further information, write the Director, Postgraduate Division, USC School of Medicine, 2025 Zonal Ave., Los Angeles 33.

MENTAL RETARDATION CONFERENCE

The first International Medical Conference on Mental Retardation will be held at the Eastland Hotel, Portland, Maine, July 27 through 31. All communications should be addressed to Conference Secretary, International Medical Conference on Mental Retardation, Care of Division of Maternal and Child Health, State House, Augusta, Maine.

CONGRESS OF SURGEONS

The annual Congress of the United States and Canadian Sections of the International College of Surgeons will be held at the Palmer House, Chicago, September 13 to 17. For details, write Dr. Ross T. McIntire, Executive Secretary, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10.

OTOLARYNGOLOGIC ASSEMBLY

The Department of Otolaryngology of the University of Illinois College of Medicine will conduct its annual Otolaryngologic Assembly September 18 through 26. In addition to lectures and panels on advancements in otolaryngology, some sessions will be devoted to surgical anatomy of the head and neck and histopathology of the ear, nose, and throat. For details, write the Department of Otolaryngology, 1853 W. Polk St., Chicago 12.



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SERVING THE MEDICAL PROFESSION OF MINNESOTA,
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A Tribute to . . .

Erling S. Platou

August 30, 1896

June 17, 1958

This June issue of THE JOURNAL-LANCET has been prepared to pay tribute to Erling S. Platou for his contributions to the field of pediatrics. This compilation of scientific papers is but a continuation of the lifelong stimulating influence of Erling Platou upon many individuals who have had the privilege of knowing him as a friend, physician, and scientist. It is certain that if Erling Platou were alive today, it would be he to whom we would be indebted for the organization of this group of pediatric reports. This would be the manner in which he would wish to express his appreciation for those to whom he felt indebted.

Erling Platou was one of those whose enthusiasm for the study of disease was kindled early in his career. Following completion of his M.D. degree at the University of Minnesota in 1920, he secured postgraduate training in internal medicine and in pediatrics in New York at the Long Island College of Medicine, at the Minneapolis General Hospital, at the Boston Floating Hospital, at the New York Nursery and Children's Hospital, and the Willard Parker Hospital for Infectious Diseases in New York City. It is certain that these opportunities to observe and study the havoc caused by the infectious diseases, a most serious problem of that day, stimulated Dr. Platou to a constant and intensive attack on these problems even up to the time of his death. It was no doubt this background of training and a deep and abiding interest in the problem of infectious and communicable diseases that made Erling Platou a superlative and stimulating clinical teacher. His weekly rounds over many years with the students and resident staff at the Minneapolis General, University of Minnesota, Abbott, and Northwestern hospitals in Minneapolis on infectious diseases and other pediatric problems were among the best and most practical teaching sessions given to the students. He had an extraordinary gift of arousing the interest of students beyond that of classroom require-

ments. Because of his great enthusiasm, interns and residents were stimulated to explore for themselves some of the fascinating clinical problems they encountered on the wards. His publications contain the names of many students, interns, and residents who were inspired to join him in many of his clinical studies, particularly on infectious diseases. It is of considerable interest that one-third of some 72 publications have appeared in THE JOURNAL-LANCET.

Besides being a distinguished pediatrician, teacher, and scholar, Dr. Platou was also a warm human being. He knew and was genuinely interested in the background, capabilities, and needs of young students, interns, and residents. He took each individual's problems seriously and was able to help many a young man to establish himself. An outstanding characteristic was the ability to stimulate students to join with him in learning as much as possible about the field of pediatrics. He knew that a good teacher listens to his students as much as he talks to them.

Many of these students, interns, and residents had the privilege of sharing his companionship on hunting and fishing trips. These sports he dearly loved. Those qualities of devotion to duty, sincerity of purpose, good sportsmanship, and fairness and a general kindness and concern for others were brought out also to me as a resident as well as to a large number of true friends who have had the privilege of his companionship on these trips.

Few men in the practice of medicine have contributed so unselfishly of their time and talent to the ideals and objectives of their profession as did Erling Platou. His devotion to high standards of education and achievement runs like a golden thread throughout the entire course of his life from student days until the time of his death. These standards he held for himself. His friends and professional peers gave recognition of this, as he was elected to lead them in whatever endeavor he began.



Erling S. Platou

This history of unselfish devotion of time and effort began in student days when he was captain of a national championship basketball team. Later, as president of the Northwestern Pediatric Society, Minnesota State Board of Health, Minnesota Alumni Association, and Northwestern Hospital staff, he had the privilege of guiding these civic institutions to greater achievement and value. He was the founder and a past president of the Minnesota Medical Foundation, today a truly effective unit offering splendid opportunities to young men interested in pursuing a career in medical education and research. It is difficult to think of any significant happening of pediatric interest in this North Central area in which Erling Platou did not play an important part.

The professional community, his patients, and his many friends were shocked when Erling Platou was struck with coronary disease in 1949 at the age of 52. It is truly tragic when one who lives a rugged and vigorous physical life is restrained. It is doubly tragic when these restrictions deprive one of the satisfactions derived in pursuit of educational and professional interests. Unfortunately, recurrent angina and manifestations of cardiac insufficiency plagued him until his death; "like a leopardess, light and poised and passing swift, she always stood before me, face to face, blocking my path whenever I advanced so that I turned and turned again in vain" (Dante's "Inferno" Canto I). Thus did the recurrent attacks of angina block a restless spirit desirous of action and a need to contribute. In spite of these repeated and exhausting difficulties, the insatiable desire to do and to be effective led to continuous efforts to contribute even up to the time of his death. He was planning enthusiastically a teaching and research program on the clinical pathologic factors related to the problem of cerebral palsy and other neurologic deficits of infants and children. In the year before his death, he had served voluntarily as a coordinator of this program in the Department of Pediatrics at the University of Minnesota. He had effectively pulled together the Departments of Pediatrics, Neurology, Obstetrics, and Genetics of the

University of Minnesota in a common effort to attack this broad problem. He participated in many national committee meetings relative to the organization of this program and brought wisdom and judgment to the National Committee developing a collaborative study program in 17 institutions in the United States.

It is clearly evident that some men never die and "pass on to their reward." As they live their lives, they leave many parts of themselves in a thousand and one ways. Those things they leave become a part of someone, something, or some effort which continues to have growth and progressive value even after they are gone. One has but to look about him to see the many parts of Erling Platou that are here with us today. The long list of personal scientific contributions which follow; the present effectiveness of those who participated with him on these studies; the value of the scientific publications in this memorial issue of *THE JOURNAL-LANCET* prepared by those who knew and loved him; the widespread educational and scientific value of the Minnesota Medical Foundation to the community and to the University of Minnesota Medical School; the standard of medical care given infants and children in this community; the standard of pediatric practice by physicians in the State of Minnesota are all parts of Erling Platou that remain and will continue to be with us. It is with this spirit of respect, appreciation, and love by those who have contributed to this issue of *THE JOURNAL-LANCET*, by its editors, by the staff of the Department of Pediatrics representing the Medical School at the University of Minnesota that this issue of *THE JOURNAL-LANCET* is dedicated to Erling S. Platou for teaching the value of ideals, for maintaining high standards of accomplishment, and for giving pupils many guiding principles which have contributed to their enduring happiness and success in the practice of pediatrics.

JOHN A. ANDERSON, M.D., Ph.D.,
Professor and Head, Department of
Pediatrics, University of Minnesota.

VITA AND BIBLIOGRAPHY OF ERLING PLATOU

1896—Born August 30 in Cooperstown, North Dakota

Education

1915—Graduated from high school, Valley City, North Dakota.

1919—Bachelor of Science Degree, University of Minnesota

1920—Bachelor of Medicine Degree, University of Minnesota.

1921—Doctor of Medicine Degree, University of Minnesota

1921 to 1923—Postgraduate study, Long Island College of Medicine, Minneapolis General Hospital, Boston Floating Hospital, New York Nursery and Children's Hospital, the Willard Parker Hospital in New York City, and pediatric clinics in Germany and Austria

Positions

1923 to 1958—Clinical Instructor, Assistant Professor,

Associate Professor, and Professor of Pediatrics, University of Minnesota

June 1958—Appointed Professor of Pediatrics, full-time, University of Minnesota

Scientific Societies

Minneapolis Academy of Medicine

Minnesota Academy of Medicine

Northwestern Pediatric Society

American Academy of Pediatrics

Honors

Sigma Xi

President, Northwestern Pediatric Society

President, Minnesota State Board of Health

President, Minnesota Alumni Association

Founder and President, Minnesota Medical Foundation

President, Northwestern Hospital Staff

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The Electron Microscope in Medical Research

ROBERT L. VERNIER, M.D., HOWARD G. WORTHEN, M.D.,
and ROBERT A. GOOD, Ph.D., M.D.

Minneapolis, Minnesota

THE DEVELOPMENT of the electron microscope and methods which make possible the study of biologic specimens at the molecular level has occurred within the past fifteen years. Although electron microscopy is in the "neonatal" period of development, numerous important observations of biologic ultrastructure have been made, and further application of the available methods promises to make the transition to ultramicroscopic morphology as exciting as the transition from gross anatomy to histology, which occurred with the use of the optical microscope in the nineteenth century.

The increased resolution and magnification possible with the electron microscope are functions of the extremely short wave length of the electron beam. Electron microscopes have been constructed which have a resolution of 4 Angström units (.0000004 mm.), near the maximum theoretic resolution. Commercial electron microscopes are available which deliver a resolution of 10 Angström units (A.), although the practical limit of resolution in biologic specimens is about 20 to 30 A.

An electron microscope may be compared to an inverted light microscope in which the light source enters at the top of the system (figure 1). The light source of the optical microscope is replaced in the electron microscope (figure 1b and c) by a tungsten filament which is heated to give off electrons which are then accelerated very rapidly down a tube which is at high vacuum. The condenser, objective, and projector lenses are replaced by electromagnetic lenses, which focus the beam of electrons in a manner somewhat analogous to the way in which glass lenses focus a beam of light. After passing through the specimen and the series of lenses, the electron beam is projected upon either a phosphor-coated viewing screen or a photographic plate where permanent images are recorded.

ROBERT L. VERNIER is research fellow of the American Heart Association and assistant professor of pediatrics at the University of Minnesota. HOWARD G. WORTHEN is instructor in pediatrics at the University. ROBERT A. GOOD is American Legion memorial heart research professor of pediatrics at the University.

Among the more difficult problems confronting the biologist interested in electron microscopy is the need for extremely thin tissue sections. Tissue sections about 100 to 200 A. (about one-millionth of an inch) are required for good electron microscopy. Special embedding methods, microtomes, and cutting surfaces make it possible to meet this rigid requirement, although the technics of tissue preparation are difficult and very laborious.

The magnifications achieved in tissue with the electron microscope (5,000 to 500,000 or more times) impose additional rigid requirements for preparation and fixation of the tissue itself. Fixation at present utilizes methods which are believed to minimize the alterations in the tissue. At present, a buffered solution of osmic acid is the most commonly used, since it is an excellent fixative and is also effective in increasing contrast within the tissues. Fine tissue structure is known to deteriorate rapidly after death, and a minimal delay between the removal of tissue from the patient or animal and fixation is essential. Hence, the best electron micrographs are obtained from biopsy specimens.

APPLICATIONS OF ELECTRON MICROSCOPY TO MEDICAL RESEARCH

Ultramicroscopic structure of the renal glomerulus. With the light microscope, the normal glomerular capillary wall appears to consist of a single membrane; however, with the increased resolution of the electron microscope, 3 distinct layers are revealed. The innermost layer is composed of a very thin lining membrane, which is an extension of the endothelial cytoplasm around the capillary. Characteristic openings or pores occur within this membrane, which apparently allow the luminal contents to contact the basement membrane proper. The basement membrane is an amorphous layer about 1,000 to 3,000 A. in thickness, which appears to form the definitive barrier to filtration of plasma. External to the basement membrane are the epithelial cells from which numerous cytoplasmic processes extend to the basement membrane, forming rows of foot processes along the outer aspect of the

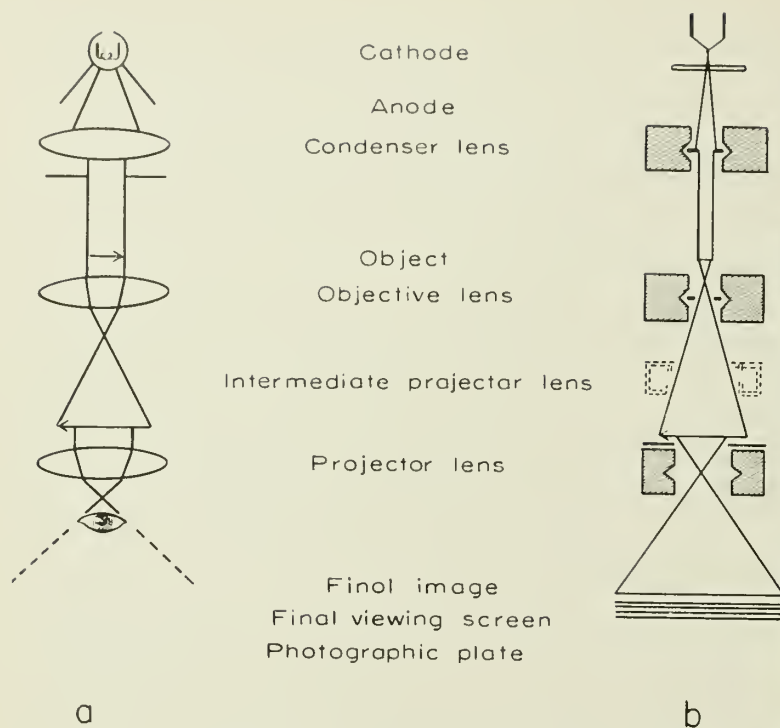
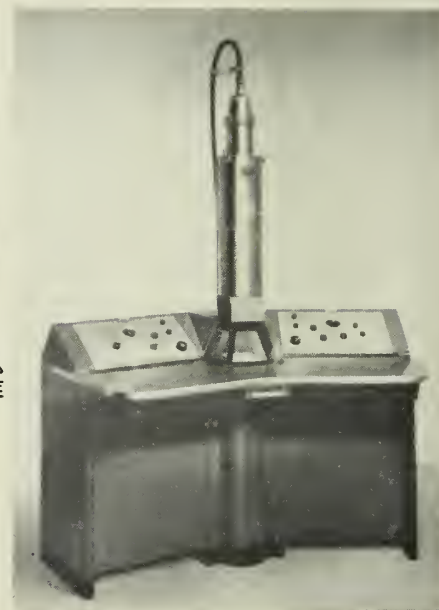


Fig. 1. The electron microscope compared with a light microscope. (a) The light microscope lens system (inverted). (b) Schematic diagram of lens system in an electron microscope. (c, right) Electron microscope.



capillary wall. The spaces between the foot processes connect with Bowman's space (figures 2 and 3).

The pathology of nephrosis. It has been observed that the kidneys of patients dying of nephrosis of short duration may show minimal pathologic changes by light microscopy and that the renal glomeruli from some cases of nephrosis are normal. Although thickening of the basement membrane is generally accepted as the earliest glomerular abnormality of nephrosis detectable by light microscopy, this change is often absent in renal biopsy specimens from cases of nephrosis in children or adults (figures 4 and 5). The high frequency of normal glomeruli in biopsy specimens is probably due to the fact that we can, with renal biopsy, obtain the specimen much earlier in the course of the nephrosis. The protein casts and lipid inclusions regularly observed in the tubules are generally agreed to be secondary findings rather than the primary pathologic changes.

In an attempt to clarify the pathogenesis of nephrosis, we have studied by electron microscopy¹⁻³ 60 kidney biopsy specimens from patients with nephrosis. An abnormality of the epithelial cells was discovered which has been

present in every case of nephrosis studied regardless of the age of the patient, the findings by light microscopy, or the cause of the nephrosis.⁴ The abnormality consists of a coalescence of the foot processes of the epithelial cell into a continuous layer along the basement membrane. The spaces between the foot processes are virtually absent in every capillary studied, and the foot processes are distorted into an uninterrupted layer of epithelial cytoplasm surrounding the basement membrane externally (figures 6 and 7).

Another abnormality of interest, observed in most cases of nephrosis, consists of large vacuoles within the epithelial cytoplasm. These vacuoles appear to contain a finely granular precipitate similar morphologically to the protein noted within the capillary lumen. No defects or pores inside the basement membrane proper, which might permit excessive proteinuria, have been observed even though a careful study of the membrane has been made.

The presence of the epithelial cell foot process abnormality in nephrosis has been consistently demonstrated; however, the full significance of the relationship of this morphologic lesion to the severe proteinuria is not understood. An important finding relating the lesion to proteinuria was

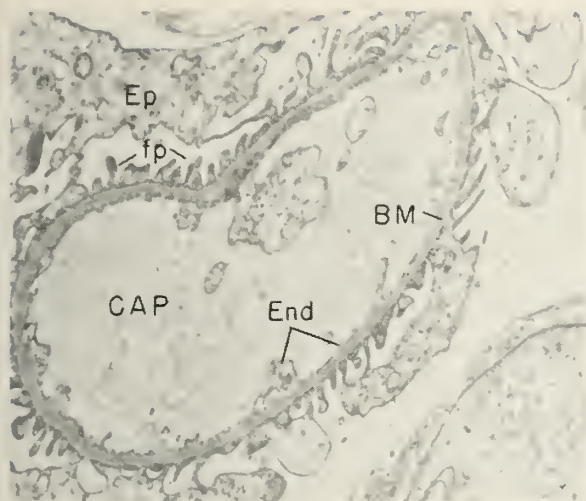


Fig. 2. Low magnification electron micrograph of a section of a renal glomerulus, showing capillary structure. Relationships of the epithelial cell and its foot processes to the basement membrane are shown; X 9,000.

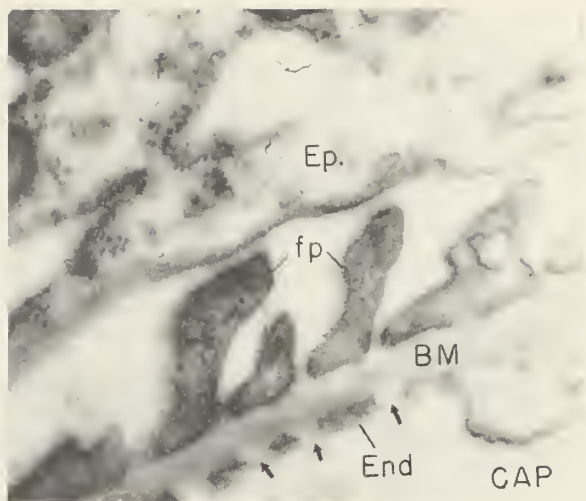


Fig. 3. High magnification electron micrograph of a segment of glomerular capillary wall. Shows relationship of epithelial cell foot processes and endothelium to basement membrane. Note endothelial pores (arrows); X 56,000.

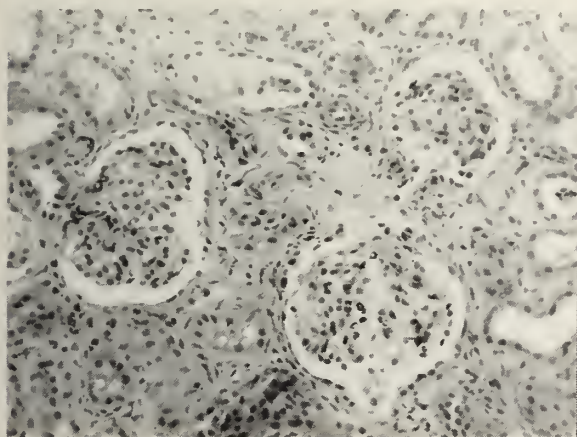


Fig. 4. Micrograph of a section of a kidney biopsy specimen from a 6-year-old boy with nephrosis. No significant changes in glomerular basement membranes could be detected. Hematoxylin and eosin stain; X 200.

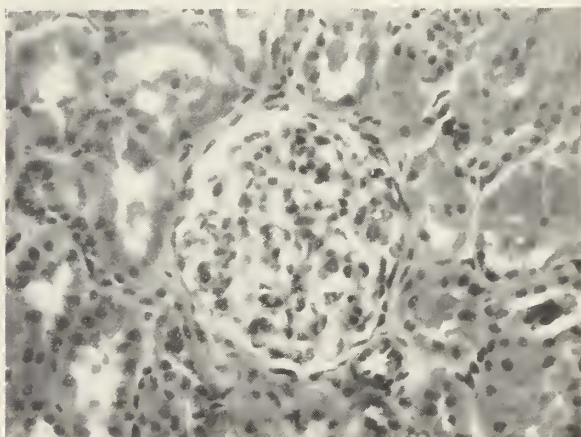


Fig. 5. Micrograph of a section of a kidney biopsy specimen from a 65-year-old man with nephrosis. Glomerular structure was considered to be normal. Hematoxylin and eosin stain; X 400.

obtained by electron microscopy of serial kidney biopsies from children with nephrosis before and after remission induced by adrenocortical steroids. Biopsies of children in remission after the urine had become normal showed that the foot processes had returned to normal and indicated that the lesion is reversible (figure 8). The fact that the reversal of the foot process lesion occurs simultaneously with cessation of proteinuria suggests that there is a causal relationship between the two events. If an alteration of the epithelial cell permits proteinuria to occur, we must reconsider the role of the epithelial cell in glomerular filtration. Studies of this type may serve as an impetus to investigation of the possibility

that the epithelial cell may be an important functional unit in filtration rather than a supporting structure of the capillary wall.

Some patients with nephrosis develop additional findings, such as hypertension, resistance to therapy, or uremia, which indicate more severe glomerular involvement. Accompanying this clinical progression is a change in the morphology of the kidney. Biopsy specimens examined by light microscopy reveal abnormalities similar to those of chronic glomerulonephritis, including hypercellularity, crescent formation, and hyalinization.

Electron microscopy of glomeruli from patients with "mixed" nephrosis-nephritis or the

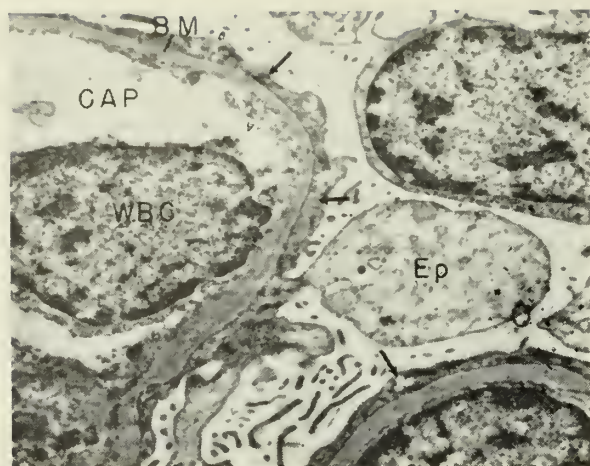


Fig. 6. Electron micrograph of a section from a kidney biopsy specimen from a 5-year-old boy with nephrosis. There are no normal epithelial cell foot processes. Foot processes have fused into a continuous layer external to the basement membrane (arrows); X 17,000.

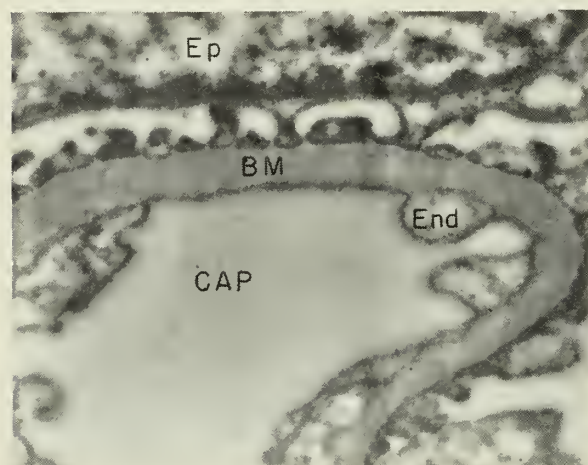


Fig. 8. This electron micrograph is representative of the morphology observed in sections of a kidney biopsy specimen obtained from a 6-year-old boy who was successfully treated for nephrosis and in whom all clinical and laboratory tests had been normal for six months. Note relatively normal epithelial cell foot processes. Electron microscopy of a kidney biopsy specimen which had been obtained prior to treatment showed a typical foot process lesion similar to figure 6; X 35,000.

nephrotic syndrome in chronic glomerulonephritis reveals that the hypercellularity is due to endothelial cell proliferation. In addition, broad bands and masses of material which resemble basement membrane are found between the endothelial cells and adjacent to the normal basement membrane. The origin of this material is not established, but its continuity with the endothelial cell and the fact that its appearance is associated with endothelial proliferation suggest that it may be a product of the endothelial cell

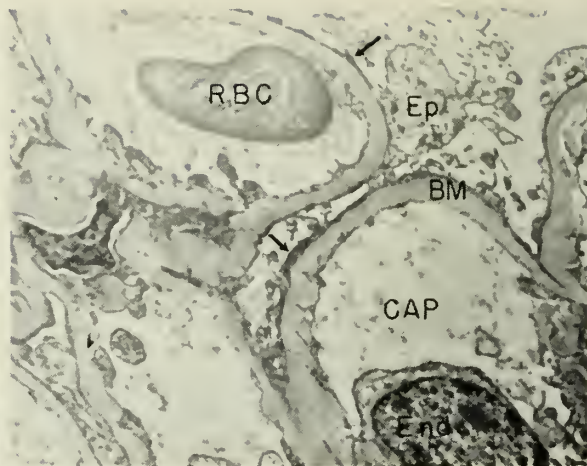


Fig. 7. Electron micrograph of a section of a kidney biopsy specimen from a 57-year-old man with nephrosis. Portions of 4 glomerular capillaries show the typical foot process abnormality. Basement membrane is irregular and thickened in some areas; X 15,000.

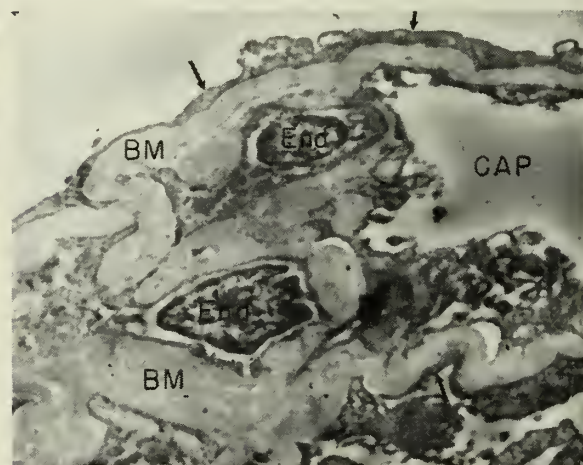


Fig. 9. Electron micrograph of a section of kidney from an adult with nephrosis, showing partial occlusion of a portion of a glomerular capillary by material resembling basement membrane. Two endothelial cells are seen embedded within this material; X 13,000.

(figure 9). Studies of adjacent sections by light and electron microscopy show that this material is hyalin and that it contributes to the ultimate fibrosis and obstruction of glomerular capillaries.

Serial renal biopsies from a number of patients with nephrosis have indicated that the pathogenesis of the glomerular lesion probably proceeds from the initial submicroscopic epithelial cell foot process lesion to endothelial hypercellularity and eventual obliteration of the capillaries by hyaline material and fibrosis. The severity of the glomerular lesion appears to be correlated with the duration and the severity of the renal disease in most patients.

The ultramicroscopic pathology of aminonu-



Fig. 10. Electron micrograph of a section of kidney obtained from a rat which had received 12 daily injections of aminonucleoside. The rat had severe proteinuria and was very edematous. Note loss of normal epithelial cell foot processes. Arrows point to pores in the relatively normal endothelium; X 11,000.

cleoside nephrosis in rats. The serial changes in morphology of the kidney which occur in one form of experimental nephrosis have been investigated in an attempt to gain further information regarding the pathogenesis of nephrosis.⁵ Rats given daily subcutaneous injections of 6-dimethylamino purine, 3-amino-d-ribose (aminonucleoside) developed proteinuria in about six days. Progressively severe proteinuria occurred, and the animals had edema, ascites, hypoproteinemia, and hypercholesterolemia by the twelfth day of the experiment. Light microscopy of the specimens of kidney from the nephrotic animals on the tenth to twelfth day revealed normal glomeruli and eosinophilic casts within the tubules. Animals sacrificed twelve to fourteen days after onset of the experiment showed thickening of the glomerular basement membranes and minimal degrees of glomerular fibrosis.

Electron microscopy of the glomeruli from animals which received 1 to 6 daily injections of aminonucleoside revealed no abnormalities. However, about the seventh day of the experiment and coincident with the appearance of proteinuria, the foot processes of the epithelial cells were swollen. Animals studied after the tenth day of the experiment showed coalescence of epithelial cell foot processes and a loss of interspaces be-

tween the adjacent foot processes (figure 10).

An additional abnormality was observed by electron microscopy of biopsy specimens of kidney from rats studied after the twelfth day of the experiment. An increase in the number of endothelial cells was apparent, and masses of an amorphous material resembling basement membrane were found between the endothelial cells. The capillary luminal area of some glomeruli was reduced greatly by the encroachment on the luminal space by these endothelial elements. These abnormalities were correlated with an elevation of blood urea nitrogen levels in animals studied after the twelfth day of injections.

Rats which were followed for twenty or more days (eight or more days after the last injection) were found to have decreasing proteinuria, and many of these animals ultimately recovered. Kidney biopsies from partially recovered rats, as reflected by decreasing proteinuria, showed some degree of foot process abnormality, but many normal foot processes were present.

This observation suggests that the foot process lesion in aminonucleoside nephrosis in rats is reversible and correlates well with the observation of reversibility of the lesion in nephrotic children treated with adrenocortical steroids.

SUMMARY AND CONCLUSIONS

The results of a series of studies of human and experimental nephrosis by light and electron microscopy are reviewed in order to show the value of this new morphologic technic in medical research.

ACKNOWLEDGMENTS

The authors are indebted to members of the staff of the Department of Medicine, University of Minnesota, who supplied the renal biopsy tissue from the adult patient described in this study. The technical assistance of Miss Joyce Lounberg and Mrs. Ruth Schurr is greatly appreciated.

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Intrahepatic Biliary Atresia

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TWO CASES of intrahepatic biliary atresia have been seen in recent years at the University of Minnesota Hospitals. One of these patients is still alive at 16 years of age and is in good health except for severe generalized pruritus. This represents the longest period of survival of a patient with this condition that has been reported to date in the medical literature.

Congenital obliteration of the extrahepatic bile ducts was reported as early as 1795,¹ and a multitude of reviews²⁻⁴ and case reports have appeared since that time. In contrast, only 22 cases of intrahepatic biliary atresia have been recorded in the literature. It was not until 1951 that Ahrens and associates⁵ recognized that this was a specific and distinguishable group. Ahrens and his group reported 4 cases and were able to find 9 earlier cases in the literature. Ten additional cases have since been reported in detail.^{6-14,20}

The median age of survival in extrahepatic biliary atresia that has not been relieved by surgery is 4 to 6 months.^{15,16} Review of the literature since 1945¹⁶ has yielded only 4 cases of patients with inoperable extrahepatic biliary atresia who survived three or more years,^{12,17-19} and the eldest of these died at the age of 5 years. In contrast, 9 of the 22 reported cases of intrahepatic biliary atresia survived three or more years. Six of these patients were still alive when reported. Swenson has reported the longest survival to date in this group and showed a photograph of a living 11-year-old child with this disease but gave no further details.

It was felt that reporting the 2 cases we have seen would be of interest, first, because of the rarity of the lesion and, second, on account of the extreme mildness of the disease in one of these children (case 2).

CASE REPORTS

Case 1. M.H., a white male infant born January 16, 1951, was first seen at the University of Minnesota Hospitals at the age of 2½ months. History obtained at that time revealed that the child had been admitted to another local hospital on two occasions. The first ad-

mission was because of feeding difficulties when he was 1 month old. He was intensely jaundiced at this time, passed very dark urine, and had acholic stools. He was also noted to have a systolic murmur. He was readmitted two days after being discharged and was treated for pyuria and possible sepsis. Because of continuing jaundice, he was referred to the University of Minnesota Hospitals.

Physical examination at the time of admission revealed pronounced icterus of the sclera and skin. A diffuse thrill was palpable over the precordium, and the heart seemed to be enlarged to the left. The heart sounds were overshadowed by a loud, harsh, systolic murmur which replaced the first sound. The abdomen was distended and tympanitic, and the liver edge could be felt 2 fingerbreadths beneath the right costal margin. The tip of the spleen was also palpable. At this time, the urine, hemoglobin, white count, and differential were all normal. Twenty-five per cent magnesium sulfate was instilled in the duodenum in an attempt to flush the bile passages. Assays on 2 subsequent occasions showed complete absence of bile. During the course of this hospitalization, the patient was again treated for sepsis.

At the age of 5 months, he was readmitted for an exploratory laparotomy. The liver appeared normal and had no green discoloration. Irrigations through the gallbladder revealed that the common bile duct was open. Instillation of methylene blue solution also showed that the dye went up into the common hepatic duct. A cholangiogram was taken on the operating table, and it showed a well-filled gallbladder and common duct and the dye emptying into the duodenum (figure 1). A biopsy of the liver (figure 2) revealed many bile thrombi throughout the liver. There were accumulations of pigment in many cells around the portal area. The lobular arrangement was normal. There was no increase in fibrous connective tissue. There was an absence of inflammatory cells, but a few swollen epithelial cells were present. The bile ducts normally seen in the portal areas were entirely absent.

One month later, the patient was again explored surgically. The liver at this time was jaundiced. It was not markedly enlarged, and its texture was somewhat friable. Considerable adhesions between the previous laparotomy incision and loops of bowel had produced a kinking and partial obstruction. A Roux-Y anastomosis was done between the upper jejunum and a wedge-shaped incision in the left lobe of the liver. A second liver biopsy (figure 3) was taken, and microscopic sections again showed the accumulations of pigment around the portal area. The bile capillaries were absent in several portal areas. In some sections, the portal areas contained a very few definite biliary passages. There was no accompanying fibrous connective tissue proliferation in these areas. The capillaries contained numerous bile thrombi, and the epithelial cells themselves contained much finely divided, greenish-brown pigment within the cytoplasm.

Postoperatively, the patient did quite well and, after

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Fig. 1. Operative cholangiogram of case 1 taken at 5 months of age demonstrating the patency of the extrahepatic bile ducts. Arrow points to the common bile duct, and the dye may be seen entering the duodenum.

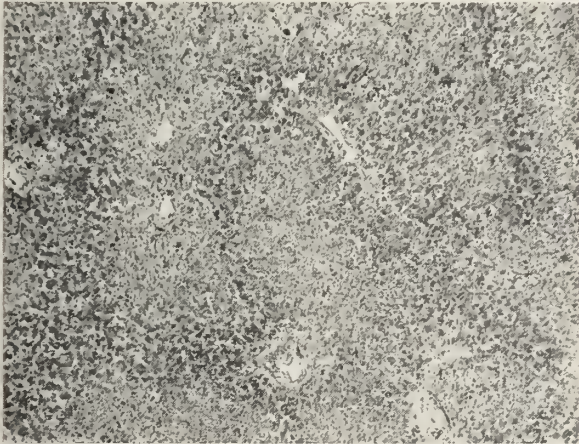


Fig. 3. Liver biopsy of case 1 at 6 months of age. Definite bile ducts were seen in only an estimated 5 per cent of the portal areas; X 40.

discharge, was followed in the outpatient clinic at monthly intervals. He had numerous episodes of epistaxis for which he was given Hykinone and whole blood transfusions with fair results. His stools remained acholic throughout this period of time.

On May 12, 1953, the patient was seen at the University of Colorado Medical Center. At this time, laboratory examinations revealed a prothrombin time of 70 per cent, coagulation time of five minutes, normal clot retraction, a bleeding time prolonged to twelve minutes, a positive tourniquet test, and a platelet count of 600,000. It was decided that the bleeding tendency, which he consistently showed, was due to a secondary vascular purpura. The bleeding tendency did not clear up following treatment with vitamin K.

The patient was admitted to the University of Minnesota Hospitals for the third and last time at the age 3



Fig. 2. Liver biopsy of case 1 at 5 months of age. Many bile thrombi were seen, especially around the portal areas. Lobular architecture is normal, and there is no increase in fibrous connective tissue. No bile ducts are seen in portal areas; X 40.

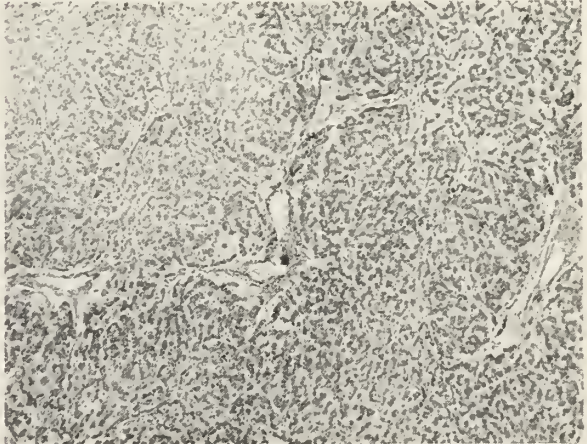


Fig. 4. Section of the liver of case 1 from the postmortem examination at the age of 3 years and 3 months. Bile ducts were seen only rarely in sections of 3 blocks of liver tissue. Fibrosis was not increased, but the amount of bile pigment was markedly decreased. Occasional foam-filled macrophages ("xanthoma cells") may be seen; X 40.

years and 2 months because of bloody vomitus and tarry stools. Physical examination revealed that the child was markedly jaundiced. On palpation of the abdomen, both the liver and spleen were felt beneath the level of the umbilicus. There were fatty deposits at the ends of the fingertips, knees, and elbows. The heart findings were unchanged, and the remainder of the physical examination was within normal limits.

The hemoglobin at this time was 4.5 gm. per cent, with a white count of 3,550 and a differential of 77 per cent neutrophils, 30 per cent lymphocytes, and 3 per cent monocytes. The bleeding time was over twenty-five minutes, and the clotting time was four and one-half minutes. One-minute bilirubin was 5 mg. per cent, with a total of 9 mg. per cent. The peripheral blood showed severe anemia, which was essentially normochromic, with leukopenia and evidence of increased regeneration and

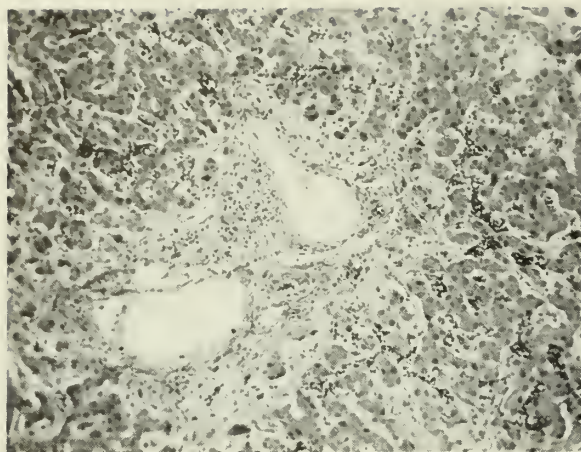


Fig. 5. Higher power view of liver (same as figure 4); X 100.

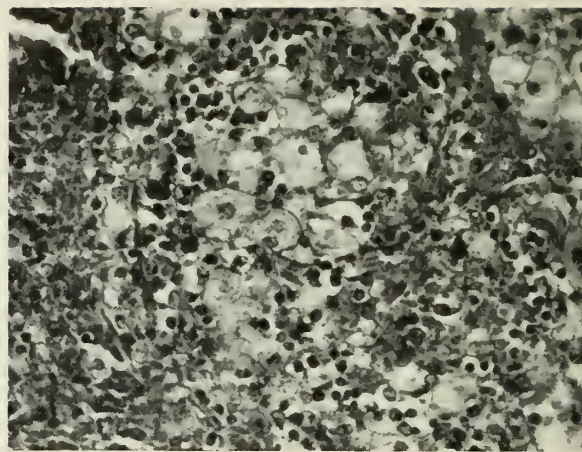


Fig. 6. Autopsy section of the spleen of case 1. Large numbers of foam-filled macrophages are visible; X 250.

TABLE 1
REPRESENTATIVE LABORATORY DATA OF CASE 1

Age in months	Bilirubin 1 min.	Bilirubin Total	Cephalin cholesterol	Thymol turbidity	Alkaline phosphatase	Miscellaneous
1	5.2	8.4			73.0	Fecal urobilinogen 1.7 mg. %
3	3.8	7.2	0	2	51.8	
5	3.5	6.1	0	5	86.5	Hemoglobin 9.9 mg. % Cholesterol 292 mg. %
6	10.3	11.2				Fecal urobilinogen 1.4 E.U. %
14	8.7	17.0			73.0	Calcium 10.2 mg. % Phosphorus 3.4 mg. %
16					85.2	
19	8.7	16.4			62.3	
28	6.5	12.5	3+			Hemoglobin 9.5 gm. % Prothrombin 70%
38	5.0	9.0				Hemoglobin 4.5 gm. % Bleeding time over 25 min.

liberation of erythrocytes. Urinalysis was normal. Laboratory findings are shown in table 1.

The patient was given 550 cc. of blood over a two-day period. He continued to have black, tarry stools. On the seventh hospital day, his hemoglobin was 9.3 gm. per cent. On the fifteenth hospital day, the patient fell and struck his head on the floor. Shortly after, the child vomited and in an hour was completely comatose with slowing respirations. The patient was taken to surgery and was cyanotic, areflexic, and almost apneic. An emergency right temporal burr hole was carried out without anesthesia or response, and a massive extradural hematoma was evacuated. There was bleeding from the middle meningeal artery on the right. Following clamping of the artery and coagulation, the patient became immediately responsive and began crying and moving all his extremities, but he died seven hours later.

Autopsy. The body was dark yellowish-olive in color, and the sclera was icteric. There was a grade II cyanosis with questionable grade I clubbing of the fingernails. There was no edema.

There were numerous fat-like deposits 1 to 5 mm. in diameter immediately beneath the skin. These deposits were located over both knees, both elbows, and at the tips of all the fingers.

The heart weighed 100 gm. On internal examination of the heart, the foramen ovale was functionally closed. However, it could anatomically be opened to 1x1 cm. There was an 8x8 mm. interventricular defect located high in the septal wall.

The stomach and small and large intestines were all bound together by firm adhesions. There was no obstruction within the bowel. The stomach contained a large quantity of dark greenish mucoid material. There was a Roux-Y anastomosis of the jejunum to the left lobe of the liver. The anastomosis was intact. A large amount of yellowish-white acholic stool was in the rectum.

The liver weighed 980 gm. and was dark green. Cut sections revealed a nutmeg appearance, suggesting passive vascular congestion of the liver. The gallbladder was thin-walled and in the normal location and contained approximately 5 to 10 cc. of very dark green material. The common duct could not be outlined, and, on compression of the gallbladder, no material drained into the duodenum through the ampulla of Vater.

The spleen weighed 450 gm. The surface of the spleen was very dark with numerous whitish, elevated nodules measuring up to 2 mm. in diameter. On cut section, numerous fibrous bands extended throughout the substance of the spleen.

There was an 8x9 cm. extradural hematoma overlying the right posterior parietal portion. It arose at the site of the middle meningeal artery and measured 2 cm. in thickness and contained soft, clotted blood. The brain had been compressed in the right posterior parietal areas by the overlying extradural hematoma.

Multiple sections were taken from the right and left lobes of the liver and the porta hepatis. Intrahepatic biliary ducts were completely absent (figures 4 and 5). There was no fibrosis or increased connective tissue. Accumulations of bile pigment were found around the portal areas but less than had been present in the earlier biopsies. There were occasional foam-filled macrophages. Islands of foam-filled macrophages were also found in the spleen (figure 6), lungs, heart, abdominal lymph nodes, skin, and bone marrow.

Case 2. J.B., a 14-year-old girl, was first seen in the outpatient department because of severely pruritic skin. At the age of 5 months, she had been diagnosed as having extrahepatic biliary atresia.

She was the product of a normal pregnancy and delivery. Shortly after birth, she had been noted to be jaundiced. She had had dark urine and light stools but was in good health otherwise. The patient continued to be jaundiced, and, at the age of 5 months, an abdominal exploration was done at the University Hospitals of the State University of Iowa. The operation revealed: "The liver was perhaps 2 to 3 times normal size. . . . Grossly, it presented the typical appearance which one associates with an obstructive cirrhosis. The gallbladder was present as a fibrous band surrounded with a moderate amount of fat. The cystic duct remnant was easily identified. . . . Dissection was carried up into the hilus of the liver. . . . A band 1 to 2 mm. in diameter (was identified) coursing along in the position normally occupied by the common duct. This band was surrounded with a capillary plexus, such as one sees along a normal common duct. There was no evidence of bile in the common hepatic, common duct, cystic duct or gallbladder. There was no dilatation of this fibrous band in the region of the hilus of the liver. . . . (The diagnosis was) an atresia of the common duct which seemed to involve its entire extent. . . ."

The patient was discharged and continued to do well clinically, and her jaundice regressed somewhat. At the age of 12 months, xanthomas were noted on her left knee and in the creases of her hands. At 2 years of age, she was put on a low-fat diet but with no improvement. The color of the stool had meantime returned to medium brown, and the urine had become lighter.

The patient was hospitalized at the University of Illinois Research and Educational Hospitals for three months. Physical examination at that time revealed very slight icterus. There were multiple yellow, raised, waxy areas over the extensor surfaces of the left knee, both elbows, and phalanges and in the crease lines of the palms and feet and in the gluteal folds. The heart was normal to percussion with a precordial basal systolic murmur. The liver border was palpable 1 cm. below the right costal margin and was regular in contour.

Admission laboratory data showed a cholesterol of 1,435 mg. per cent, an albumin of 4 gm. per cent, globulin of 1.5 gm. per cent, icteric indexes of 19 and 20 units, vitamin A of 260 gamma per cent (normal 100 to 200), bilirubin of 3.4 and 2.5 mg. per cent, and a negative cephalin flocculation test. Two cholecystograms were attempted but failed to visualize the gallbladder. The patient was placed on a low-fat, low-cholesterol diet with added vitamin K, choline, and inositol. Cholesterol was

1,003 mg. per cent at the start of the diet and 733 mg. per cent after three days, 820 mg. per cent after twenty-eight days, and 504 mg. per cent after two months.

On this low-cholesterol diet, the xanthomas disappeared, and, after a year or two, the mother stopped the diet. The patient was then well until the age of 6 to 7 when marked pruritus of her arms and legs developed. This condition occurred mainly at night and was unrelated to seasons. It was felt that the pruritus was more intense following a fatty meal. The usual variety of topical antipruritics were tried over the next few years but without pronounced or permanent relief. The mother stated that at times the patient scratched her arms until they bled.

Physical examination revealed a well-developed, slightly obese, white girl with a low, hoarse voice. The skin had 2 to 5 mm., slightly elevated, pink to purple spots on the forearms, calves, and thighs (figure 7). There was a grade II soft systolic murmur along the left sternal border, and the second pulmonic sound was louder than the second aortic sound. The blood pressure was 115/75. The liver was down 1 to 2 cm. from the right costal margin.

Blood count and urinalysis were within normal limits. Serum cholesterol ranged from 334 to 414 mg. per cent. Serum albumin was 3.3 gm. per cent, globulin was 4.8 gm. per cent, and alkaline phosphatase was 53.9 K-A units. Total serum bilirubins were 0.8 and 1.0 mg. per cent, thymol turbidity was 3 units, and cephalin flocculation was negative. A Bromsulphalein retention test showed 40 per cent retention at the end of forty-five minutes. Prothrombin, bleeding, and clotting times were all normal. Two urines were negative for bilirubin and urobilinogen by qualitative tests. The blood urea nitrogen, calcium, and phosphorus were all normal. A lupus erythematosus clot test was negative. Blood types were B, CD positive, and E negative for the patient and O, CD positive, and E negative for the mother. A cholesterol drawn on the mother was 194 mg. per cent, and an alkaline phosphatase was 10.1 K-A units. An electrophoretic pattern showed that the increased globulin was in the alpha 2 and beta fractions. A cholecystogram (figure 8) showed good delineation of the gallbladder, and the fat response showed contraction of approximately 50 per cent of the normal size. The duct system per se was not delineated.

The electrocardiogram was within normal limits. Cardiac fluoroscopy showed an aberrant right subclavian passing behind the esophagus but was otherwise normal. The patient was seen by the pediatric cardiologist, and, in their opinion, the cardiac murmur was functional. A liver biopsy was taken by the Silverman-needle technique and yielded a piece of liver approximately 1.2 cm. in length. Sections (figure 9) showed an elongated piece of liver parenchyma made up of pieces of several lobules. The hepatic cells were quite uniform in size and staining throughout. There was no remarkable increase in fibrous tissue, and the portal spaces appeared small. There were a few lymphocytes. There was no excess of pigment. No interlobular bile ducts were seen. Punch biopsy of the skin showed only a nonspecific dermatitis.

The patient was discharged on a diet of 50 mg. of fat and 110 mg. of cholesterol. On November 15, approximately one month after the diet had been started, the total cholesterol was 320 mg. per cent. On November 22, the pruritus had not changed, and she was started on sitosterol. On December 3, a fasting vitamin A level of 34 gamma per cent and a five-hour level of 116 gamma per cent were recorded. On February 7, the cholesterol

TABLE 2
REPRESENTATIVE LABORATORY DATA OF CASE 2

Age	Bilirubin 1 min.	Bilirubin Total	Cephalin cholesterol	Thymol turbidity	Alkaline phosphatase	Cholesterol	Miscellaneous
27 months		3.4	0			1,435	
28 months						783	
29 months						820	Bromsulphalein 10% in 40 minutes
30 months		2.8				504	
14 years 5 months	0.4	0.8	0	3	53.9	364	
14 years 7 months	0.4	1.0				414	
15 years						343	Total lipids 2,225 mg. %

TABLE 3
INCIDENCE OF INTRAHEPATIC BILIARY ATRESIA
REPORTED IN RECENT SERIES

Author	Cases	Histologic examination performed in	Number of intrahepatic atresias found
Gross ²⁰	146	—	1
Moore ¹⁰	31	19	1
Kiesewetter ²¹	25	—	1
Redo ¹²	27	17	1
Myers ¹⁵	40	21	0
Christy ²²	37	27	5
Krovetz	22	17	2



Fig. 7. Case 2 illustrating the slightly elevated, pink to purple lesions.



Fig. 8. Oral cholecystogram of case 2 at 14 years of age. The gallbladder is delineated well and contracted approximately 50 per cent after a fatty meal.

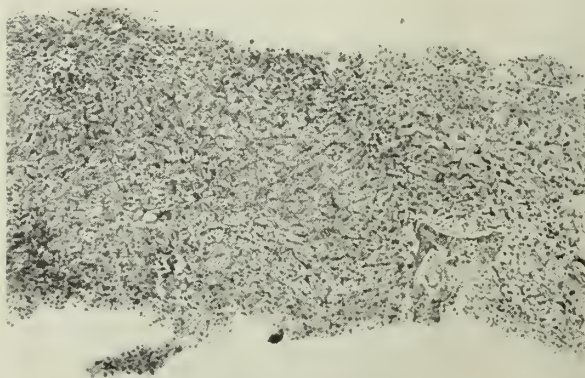


Fig. 9. Liver biopsy in case 2 taken at 14 years of age by a Silverman needle. No interlobular bile ducts were seen in any of the 8 sections cut. Architecture is normal, and there is no accumulation of bile pigment.

was 343 mg. per cent. Neither the pruritus nor the skin lesions were alleviated very much during the period of observation. Laboratory findings are shown in table 2.

DISCUSSION

The relative frequency of intrahepatic biliary atresia among all cases of biliary atresia has varied somewhat in recent reports (table 3). Myers and associates¹⁵ found no cases among 21 histologic examinations of the liver, whereas Christy and Boley²⁰ found 5 cases out of 27. Our own experience lies midway between these extremes, with 2 cases of intrahepatic biliary atresia among 17 histologic examinations. During the period from 1945 to 1958, a total of 123 cases of biliary atresia was reported in the literature.¹⁶ Of these, 14 were of the intrahepatic variety. Histologic examination of the liver was only mentioned 11 times in reports among the 109 cases of extrahepatic atresia. Whether some of these cases also had intrahepatic biliary atresia is a matter of speculation.

Table 4 lists the more recent cases of intrahepatic biliary atresia. Chu and associates²¹ and Motsay and Hall²² have reported single cases that were said not to have intrahepatic biliary ducts. No details were mentioned of the biopsy reports, and, from the context of these articles, the authors may well have been referring to grossly visible ducts presumably suitable for choledochostomy. One case is mentioned by Gross,²³ 1 by Kiesewetter and associates,²⁴ and 5 by Christy and Boley²⁰ but are not included in this table because of lack of further details.

It is interesting to note that, in 8 instances, the extrahepatic tree was not functioning, and, in 10 instances, it was normal or nearly normal. Those who survived the longest length of time are in the group with a normal extrahepatic system, but 1 child with an associated extrahepatic biliary atresia lived to the age of 9 years and 3 months, and another was still alive at the time of report at 6 years and 6 months.

In case 1, the absence of intrahepatic biliary ducts seems to be well established, but the question of an associated extrahepatic biliary atresia was raised at the time of autopsy. An operative cholangiogram (figure 1) taken at 5 months of age shows that the common bile duct was patent and emptied into the duodenum. The failure to demonstrate the patency of the extrahepatic biliary ducts at autopsy may have been due to the adhesions from the previous surgery or to faulty technic on the part of the dissector.

The status of the extrahepatic biliary tree in the second case is in some doubt because of the early surgical note stating that only fibrous cords

were present. A number of similar cases has now been reported in the literature.^{14,23} Kanof and associates²⁵ have noted this phenomenon and suggested that the small biliary tree may have a remarkable capacity for postnatal growth. This patient would certainly appear to have an adequately functioning extrahepatic biliary system at the present time in view of the normal cholecystogram, the absence of jaundice, and her present reasonably good health.

Two theories have been advanced concerning the increased longevity demonstrated by cases of intrahepatic biliary atresia. Krahulik and co-workers⁸ feel that increased lengths of survival are being reported for both intrahepatic and extrahepatic biliary atresia. He reasons that the usual causes of death are related to infections and hemorrhages, and that the advent of antibiotics and vitamin K has increased survival in both groups. As mentioned earlier, comparison of all cases of extrahepatic biliary atresia reported since 1945 demonstrates that patients with intrahepatic biliary atresia live significantly longer. Furthermore, the cases of intrahepatic biliary atresia date back to 1865, and the case reported by Finlayson²⁶ survived to 3 years, 3 months in the preantibiotic era.

Ahrens and associates⁵ have suggested that the absence of intrahepatic ducts protects the remaining liver parenchyma. Microscopic examination of the livers in their cases revealed varying degrees of fibrosis in the portal areas but "no localized collections of inflammatory cells suggesting a burned out reaction around previously existing ducts." They postulated that the absence of intrahepatic ducts might limit the amount of pressure damage to the liver cells. Christy and Boley²⁰ determined the per cent of hepatic fibrosis in 31 liver specimens from 27 patients with biliary atresia. The per cent of fibrosis varied from 4 to 37 per cent, and 8 of these specimens had more than 20 per cent fibrous tissue. Four of these specimens were from patients with intrahepatic biliary atresia, and the amount of fibrosis in these livers ranged from 6 to 15 per cent. While the data offered are probably not conclusive, they tend to support the contention of Ahrens and his associates.

SUMMARY AND CONCLUSIONS

Two cases of intrahepatic biliary atresia are added to the 23 cases previously reported in the literature. One of these patients is still alive at 16 years of age and is in relatively good health except for severe pruritus. This is the longest length of time that a patient with biliary atresia has been reported to have survived.

TABLE 4
REPORTED CASES OF INTRAHEPATIC BILIARY ATRESIA, 1932-1958

Author and date	Sex	Onset of jaundice	Age died	Xanthoma	Cholesterol	Extra-hepatic	Intrahepatic	Miscellaneous
Sweet, ^{3,27} 1932	F	Birth	1 yr.	No	—	Hepatic ducts not patent	Very scarce intrahepatic ducts, many of which were solid cords of epithelial cells. Moderate periportal necrosis with early fibrosis. "Varying amounts of bile pigment."	Idiopathic hypertrophy, right ventricle. Sibling of next case.
Sweet, ^{3,27} 1932	M	3 days	50 days	No	—	Hepatic ducts solid cords	Few bile ducts without bile and with very small lumina. Very wide-spread necrosis with early fibrosis. No bile in any ducts, but varying amounts of bile pigment present.	Interventricular septal defect. Sibling of preceding case.
Finlayson ^{3,28} 1937	F	1st week	3¼ yrs.	Yes—14 mos.	—	Common and hepatic ducts solid cords	No large or small ducts. Considerable amount of fibrosis. Occasional clumps of inspissated bile.	
Dahl-Iversen and Gormsen ^{4,5} 1944	F	Birth	7 mos.	No	—	Absence of entire tract	Absence of large ducts. Proliferation of smallest ducts with bile plugs and cirrhosis.	
Dahl-Iversen and Gormsen ^{4,5} 1944	F	Birth	Birth	No	—	Normal	No ducts in 42 of 50 portal spaces. No bile plugs.	
Sacrez, ^{3,28} 1946	F	8 days	3½ yrs.	No	—	Normal	No ducts in 90 of 100 portal spaces.	
Dobbs, ^{3,7} 1949	F	2 days	2¾ yrs.	Yes—20 mos.	1,081-1,200	Normal	No large or small ducts. Plugs in canaliculi.	
Ahrens, ⁵ 1950	F	Birth	3½ yrs.	Yes—1¾ yrs.	149-1,816	Left hepatic duct absent; others patent but small	No large or small ducts. Plugs in canaliculi.	
Ahrens, ⁵ 1950	M	2 days	Living at 6½ yrs.	Yes—3½ yrs.	687-1,020	Hepatic ducts solid cords; others patent but small	No large or small ducts. Plugs in canaliculi.	
Krahulik, ⁸ 1952	M	2 weeks	9¼ yrs.	No	—	Absence of entire tract	Rare intrahepatic bile ducts lined by low cuboidal epithelium. Severe cirrhosis.	Hepato-jejunostomy attempted at 6 mos.
MacMahon ⁹ 1952	M	8 days	Living at 10 yrs.	Yes—8 yrs.	1,686	Normal	No interlobular bile ducts, but peribiliary ducts were unduly conspicuous. Minimal bile stasis and moderate degree of biliary cirrhosis.	
Moore, ¹⁰ 1953	M	—	3 mos.	—	—	"Noncorrectable"	No bile ducts in any of 14 portal areas studied. No portal fibrosis or round cell infiltration.	
Moyson, ¹¹ 1953	F	—	Living at 1 yr.	No	212-300	Normal	No major bile ducts and very rare secondary ducts. Bile plugs in canaliculi.	
Redo, ¹² 1954	F	Birth	17½ mos.	—	—	Hepatic, common, and cystic ducts absent	"No intrahepatic duct tissue on autopsy."	
Sacrez, ²⁹ 1956	M	2 mos.	3 mos.	—	—	Normal but narrow	Rare bile ducts in portal spaces. Minimal cirrhosis but intense bile stasis.	
Sass-Kortsak ¹³ 1956	F	3 days	3½ mos.	No	362-922	Normal	No bile ducts in 495 of 500 portal tracts. Very little bile stasis. Moderate increase in fibrous tissue in portal tracts but no inflammatory cells.	

Author and date	Sex	Onset of jaundice	Age died	Xanthoma	Cholesterol	Extra-hepatic	Intrahepatic	Miscellaneous
Clinical pathological conference, ⁹ 1957	F	Birth	Alive at 6 yrs.	No (general brownish pigmentation)	—	Normal	No bile ducts in portal areas. No bile stasis. Slight widening of portal triad but no cirrhosis.	
Haas, ⁷ 1958	F	4 days	Alive at 3 yrs., 10 mos.	Yes—3 yrs., 2 mos.	500-1,600	Common bile duct could not be identified with certainty at exploratory laparotomy at 16 days.	Bile ducts absent. No cirrhosis or bile stasis.	
Swenson, ¹¹ 1958	M	—	Alive at 11 yrs.	—	—	—	—	

The survival of these cases is longer than in inoperable cases of extrahepatic biliary atresia. Fibrotic and cirrhotic changes appear to be less with intrahepatic biliary atresia and may account for this difference.

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Bilateral Renal Hypoplasia

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SMALL KIDNEYS may be due to faulty development, as in hypoplasia and aplasia, or the cause may be atrophy secondary to disease in normally developed kidneys. In aplasia, specific renal structures are absent. In hypoplasia, renal structures are found but in smaller numbers than usual. While aplasia is incompatible with life for more than a brief duration, hypoplasia may occur in different degrees of severity and, thus, support life for various periods of time.

Atrophy of the kidneys is most often due to pyelonephritis or glomerulonephritis. Frequently, atrophy occurs in hypoplastic kidneys, and it may be exceedingly difficult to decide which factor is the most important in ultimately determining the size of the kidneys.

The following case presents this problem as well as findings of some extensive changes due to chronic renal insufficiency.

CASE HISTORY

A 10-year-old boy was seen because of shortness of stature. He was 48 in. tall and weighed 51 lb. as compared to 55.2 in. and 71 lb. for the fiftieth percentile at his age. The parents noted that he was smaller than his siblings at the age of 2 years, and this difference became gradually more marked. He had wet his bed until he was 8 years old. At the age of 7, albuminuria was noted by the family physician. At this time, he urinated frequently and possibly had polydipsia. He was seen in a Crippled Children's Field Clinic at the age of 9 and again six months later. A brownish pigmentation of the skin was noted. Physical examination was otherwise negative. The urine contained no albumin, sugar, or erythrocytes. An occasional leukocyte was seen. The specific gravity of the urine was 1.008. He weighed 44½ lb. and was 45½ in. tall at the age of 9.

The patient was born at term after an uneventful pregnancy and delivery. An extra phalanx was attached to the distal phalanx of the right thumb, and there was ulnar deviation of the corresponding left phalanx. A non-specific deformity of both feet was noted. The extra phalanx was later removed and the feet corrected in casts.

The birth weight was 6 lb., 10 oz., and development during infancy was apparently normal. At 1 year, he weighed 18 lb. He was bowel trained at 2 years. He had chickenpox and measles at the age of 7, but no

episode of febrile illness followed by urinary symptoms or swelling could be elicited. The family history was noncontributory.

Physical examination revealed a well-proportioned, but small, boy in no apparent distress. He had somewhat negroid features and a brownish-yellowish pigmentation of the skin, most pronounced on the extremities and in the axillae. There was ulnar deviation of the distal phalanx of the left thumb, and he was markedly flatfooted and slightly bowlegged. The blood pressure was 115 systolic over 85 diastolic. Examination was otherwise negative. Both testes were in the scrotum.

Urinalysis showed 2+ albumin, 8 to 10 erythrocytes, and 2 leukocytes per high powered field. The specific gravity was 1.010, and the pH 7.4. Daily urinalyses during the next fourteen days showed variations of the specific gravity between 1.008 and 1.010. A concentration test did not bring the specific gravity above 1.010. Maximal dilution was to 1.002. The pH varied from 5.5 to 7.4. Cultures of the urine were negative on 2 occasions. The blood urea nitrogen (BUN) was 140 mg. per cent.

Cystoscopy and retrograde pyelography revealed extremely small kidneys and narrow and elongated renal pelvises. Only 3 calyces were seen on each side (figure 1).



Fig. 1. Retrograde pyelogram demonstrating dwarfed kidneys. Each kidney has only 3 calyces.

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TABLE 1
VARIATION IN SERUM ELECTROLYTES AND BLOOD UREA NITROGEN

Date	BUN†	CO ₂ °	K°	Na°	Chl°	Ca†	P†	Miscellaneous
10/30	140	16	5.4	144	105	9.5	5.8	Serum alb.: 6.6 gm. Serum glob.: 1.8 gm. Alk. phtse.: 17 K-A, u.
2/25	150	9	7.4	142	106	10.0	6.9	Urine: 3+ alb.
3/26	208	18	6.0	133	81	9.9	2.8	Serum alb.: 3.2 gm. Serum glob.: 1.1 gm.

°mEq./l

†mg. per cent

Daily recordings of the blood pressure showed that it varied between 100 to 136 systolic and 78 to 92 diastolic. The optic fundi were normal.

Further studies were carried out to evaluate secondary changes. Serum CO₂ was 16 mEq./l, chlorides 105, sodium 144, and potassium 5.4 mEq./l. Serum calcium was 9.5 mg. per cent, and phosphorus was 5.8 mg. per cent. Total serum protein was 6.6 gm. per cent with 4.8 gm. per cent albumin and 1.8 gm. per cent globulin. Free cholesterol in the serum was 95 mg. per cent, and cholesterol esters were 230 mg. per cent. Fractionation by electrophoresis showed an increase in the phospholipid content to 14 mg. per cent. Variation in serum electrolytes and BUN are shown in table 1.

Radiograms of the wrists and ribs revealed irregular calcification and flaring at the epiphysis (figure 2). The bones of the skull, pelvis, and upper extremities showed coarsened trabeculation, and bone maturation was delayed. The sella turcica was enlarged, and the paranasal sinuses were underdeveloped. Radiograms of the chest showed cardiomegaly with normal lungs. Electrocardiograms revealed left ventricular hypertrophy.

The leukocytes in the peripheral blood numbered 5,600. There were 7 per cent monocytes, but the differential count was otherwise normal. The hemoglobin was 6.5 gm. per cent, and the hematocrit was 20 per cent. The mean corpuscular volume was 102 cμ., and mean corpuscular hemoglobin concentration was 32.5 per cent. The reticulocytes numbered 0.9 to 2 per cent. Fragility of the erythrocytes was slightly increased. A test for sickling was negative.

A smear of the peripheral blood revealed normochromasia and poikilocytosis but no anisocytosis. The leukocytes showed no morphologic abnormalities. The number of platelets appeared normal.

By electrophoretic and alkaline denaturation tests, the hemoglobin was found to be of the adult type. No fetal hemoglobin was present.

A biopsy of the left iliac crest was done after unsuccessful attempts at aspirating bone marrow from the sternum. On examining smears of the bone marrow, depression of the erythroid and myeloid line was found. The M-E layer was 1 per cent and the fat layer 0 per cent of the bone marrow hematocrit. There were 10.6 per cent developing erythrocytes, 41.9 per cent neutrophils and precursors, and 44.6 per cent of nonhematopoietic cells—chiefly lymphocytes and histiocytes. The granulocytes showed normal maturation and were somewhat less depressed than the developing erythrocytes. The megakaryocytes appeared normal in number with normal thrombocytopoiesis. Many phagocytic cells were seen. Several were filled with lipoid material, so-called "foam cells." Hemosiderin was also found in histiocytes, sometimes with lipoid material. Several osteoblasts and osteoclasts were present in some smears of the marrow.

No tumor or lupus erythematosus cells were observed.

Sections of the bone marrow revealed generalized hypoplasia of the hematopoietic elements and rather extensive myelofibrosis. The fibrous tissue appeared to be young and proliferative. Aggregates of "foam cells" and scattered deposits of hemosiderin pigment could be seen in the proliferating fibrous tissue. Cholesterol crystals were also seen. No granulomas were observed.

Response to a Thorn test was normal, and the 17-ketosteroids in the urine were 2.1 mg. in twenty-four hours. Fasting blood sugar was 115 mg. per cent. Serum bilirubin was 0.0 per cent direct and 0.2 mg. per cent total. Thymol turbidity was 2 units. The basal metabolic rate was -5 per cent, and the radioactive iodine uptake was 43 per cent in twenty-four hours.

The patient was closely followed during the next five months until he expired. Three blood transfusions were given to keep the hemoglobin around 8 gm. The urine continued to show 2+ albumin with only occasional leukocytes and erythrocytes. The Sulkowitch reaction in the urine was 1 to 2+. Excretion of amino acids in the urine was within normal limits.

After three months, the blood pressure had risen to 150/120 and the BUN to about 200 mg. per cent. Two episodes of convulsions occurred, which were controlled by Sodium Amytal. Lumbar puncture revealed a spinal



Fig. 2. The distal metaphysis of the radius and ulna show delayed and irregular ossification of the epiphyseal cartilage and slight widening of the osteoid seam. Trabecular pattern of radius, ulna, metacarpals, and phalanges is coarser than normal. Bone age is about 5 years.



Fig. 3. Kidneys measuring 3x2x1 cm. weighing a total of 18 gm. Surface is granular and pitted.

fluid pressure of 410 mm. of water. There were 3 to 4 leukocytes per cubic millimeter, and the content of sugar and chloride was normal. The protein content was 62 mg. per cent. Smears and culture for bacteria were negative. The serum calcium was 9.1 mg. per cent, and the phosphorus was 3.5 mg. per cent. The CO_2 was 19 mEq./l, and the potassium was 7.5 mEq./l. The latter came down to 5.6 mEq./l after intravenous administration of 1,000 cc. of dextrose in water and insulin.

Preterminally, the blood pressure rose to 190/150. The optic fundi remained negative. The patient developed moderate edema, which disappeared after restriction of fluid. The CO_2 fell to 13 mEq./l but was restored to 20 mEq./l by giving 1/6 molar sodium lactate. He seemed to be getting along fairly well. However, after being allowed up and around, severe convulsions developed and were followed by coma and death.

An autopsy was performed. The most striking finding was the extremely small kidneys. Their total weight was 18 gm., and each measured 3x2x1 cm. The renal artery and vein appeared normal on both sides as did the renal pelvis and upper ureter (figure 3). The capsules of both kidneys were firmly adherent. Cut surfaces were dull, yellowish-grey in color, and granular. The corticomedullary line was almost obliterated. The renal architecture was hardly distinguishable. No cysts, infarcts, petechiae, abscesses, or stones were seen on gross examination. The calyces looked smaller than normal (figure 4). Pyramids

were later reconstructed in an attempt to determine their exact number. Each kidney contained 4 or 5 pyramids.

The microscopic examination of the kidneys revealed extreme cortical atrophy due to atrophy of the tubules, which, in some places, were almost absent. The number of glomeruli was greatly reduced, and 95 per cent showed varying degrees of hyalinization. There were no signs of the earlier lesions of glomerulonephritis. A few small foci of lymphocytes were found, mostly in the areas of severe tubular atrophy and replacement fibrosis. The arteries and arterioles in the kidneys showed extensive atrophy, thickening, and attenuation of the lumen, but there was no true hyaline arteriosclerosis or arteriolesclerosis (figure 5).

The parathyroid glands were markedly enlarged, weighing a total of 1.9 gm. Microscopic sections revealed hyperplasia. All 4 glands showed the same picture. Chief cells and intermediate cell types predominated. Large, clear cells were notably absent, and fat was hardly seen (figure 6).

The heart weighed 184 gm. There were no defects or anomalies. All the valves were normal. There were no mural thrombi. The coronaries appeared normal. The left ventricle was markedly hypertrophied. The aorta and its branches in the thorax and abdomen were normal.

The other findings at autopsy were not remarkable.

DISCUSSION

Prior to death, the following various causes for the extremely small kidneys were considered:

1. *Glomerulonephritis or pyelonephritis.* The history of albuminuria during the last three and one-half years, the presence of a few erythrocytes, azotemia, and an increasing blood pressure indicated an inflammatory process. Absence of an increased number of leukocytes in the urine, negative urine cultures, normal findings on cystoscopy, and no history of an acute febrile episode followed by urinary symptoms indicated glomerulonephritis rather than pyelonephritis.

2. *Renal hypoplasia.* The extremely small size of the kidneys, as seen on pyelography, and the decreased number of calyces raised the question of hypoplasia of the kidneys. Characteristic pyelographic patterns have been ascribed to hy-



Fig. 4. Bisection of kidneys reveals only 6 minor calyces on the left, whereas only 4 can be discerned on the right.

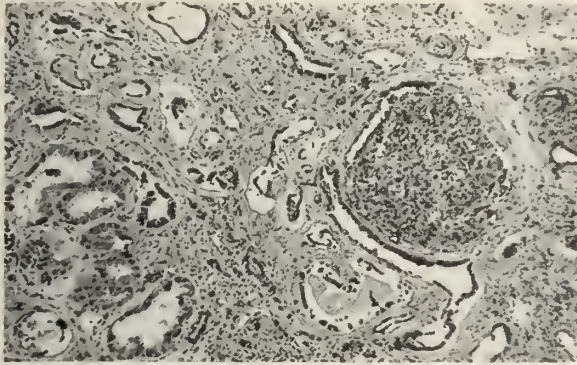


Fig. 5. Section from kidney revealing proliferation of endothelial cells, Bowman's space is obliterated, and there is severe tubular atrophy associated with absent or obstructed glomeruli. Interstitial tissue is increased due to proliferative fibrosis ($\times 100$).

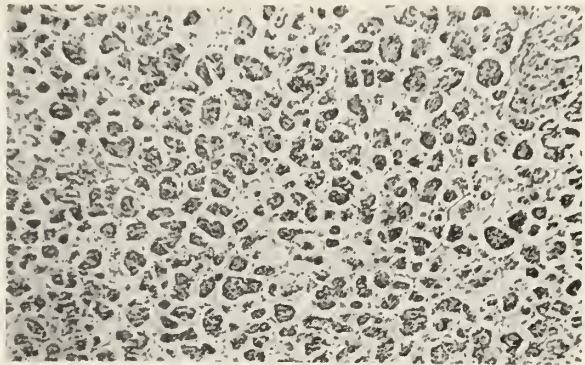


Fig. 6. Representative area of parathyroid gland. Note predominance of chief cells and intermediate cells and the absence of fat. The conspicuous interstitial component in the photograph is partly formalin fixation artefact ($\times 60$).

poplasia,¹⁻³ such as absence of major calyces and enlarged, bulbous, triangular, or ampullary pelvis. Caffey,⁴ however, includes all of the aforementioned shapes of the renal pelvis among the normal variations. Emmett and associates⁵ demonstrated that there is no relationship between pyelographic patterns and the pathologic appearance of the kidneys. Therefore, no definite diagnosis of renal hypoplasia was made prior to death, but the possibility was kept in mind.

3. *Lipoid storage disease.* The conspicuous pigmentation and the presence of large numbers of histiocytes and phagocytized lipid material in the bone marrow made us consider lipoid storage disease initially. Absence of characteristic involvement of the skeletal system, liver, and spleen and the ensuing clinical course were not characteristic of this disease.

The microscopic picture of the kidneys at autopsy was clearly that of chronic glomerulonephritis. This condition alone may account for the small size of the kidneys. In the present case, however, the number of pyramids and calyces was decreased. In Bell's⁶ series of 213 cases of chronic glomerulonephritis, the smallest kidneys weighed 33 gm. and were found in a 25-year-old man. In an 8-year-old boy, the weight of both kidneys was 41 gm. Paetzel,⁷ however, states that glomerulonephritis alone rarely produces really dwarfed kidneys. Mathe¹ and Kempf⁸ maintain that atrophic changes are usually found in hypoplastic kidneys, and Campbell² states that chronic nephritis is characteristically present in hypoplasia of the kidneys.

Decreased number of pyramids is considered a criterion of renal hypoplasia by Bell⁶ and Herbut.⁹ Emmett and associates⁵ feel that the identification of pyramids is too uncertain to serve as a reliable criterion of hypoplasia.

The decreased number of pyramids and calyces and the extremely small size of the kidneys indicate that congenital hypoplasia was present in the case under discussion. Retardation of growth was probably present during the first year of life. Glomerulonephritis at this age is rather uncommon. Bell⁶ described 2 cases of acute glomerulonephritis occurring during the second year of life and 2 cases of chronic glomerulonephritis in patients who died at age 7.

Chronic glomerulonephritis was present in our case but occurred most likely in hypoplastic kidneys. The role of each in producing renal failure is difficult to evaluate.

SUMMARY

A case report of a 10-year-old child dying from renal failure is presented. At autopsy, the combined weight of the kidneys was 18 gm. Extensive changes due to glomerulonephritis and decreased number of calyces and pyramids were found. It was felt that the most probable cause of the dwarfed kidneys was glomerulonephritis occurring in hypoplastic kidneys.

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Recurrent Retropharyngeal Abscess

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ACUTE ABSCESSES in the throat may be retrotonsillar, peritonsillar, or retropharyngeal. We have recently seen a child with the latter type.

CASE HISTORY

S. K., a 5½-year-old white male, was seen on May 29, 1958, with a two days' complaint of fever, sore throat, and swollen glands of the neck. On examination, the pharynx and tonsils were enlarged and very red and accompanied by bilateral enlargement of the anterior cervical nodes. The remainder of the examination was normal. The white blood cell count was 29,800 per cubic millimeter. The patient was given 300,000 units of procaine penicillin in sesame oil with 2 per cent aluminum monostearate and instructed to return to the office in four days.

On return appointment, June 2, he was still febrile. He had no cough. On examination, the pharynx and tonsils were still inflamed and enlarged and covered with a whitish exudate. The anterior cervical lymph nodes were still enlarged and tender bilaterally. The patient held his head erect and complained of pain in the neck when his head was hyperextended, although he was able to flex his neck without difficulty. The remainder of the examination was negative. The white blood cell count was 13,200 per cubic millimeter and the hemoglobin was 12.2 gm. per cent. He was started on 125 mg. of Albamycin syrup four times daily and instructed to return in four days.

The next evening, June 3, the patient was seen at his home because of increasing sore throat accompanied by pain in the neck, particularly when hyperextending or rotating his neck, although he could flex it satisfactorily. Because of his toxicity and poor response, hospitalization was recommended and instituted.

Admission Laboratory Work. The white blood cell count was 28,400 per cubic millimeter with 84 per cent polymorphonuclear leukocytes. A spinal tap revealed no cells and negative culture and normal sugar and protein. Urinalysis and a blood culture were negative. A throat culture revealed coagulase positive staphylococci and a few colonies of beta hemolytic streptococci. The staphylococci were resistant to penicillin. Albamycin, sulfonamides, Ilotycin, and streptomycin but were sensitive to Aureomycin, Achromycin, Terramycin, Chloromycetin, and Furadantin. A chest x-ray showed increased markings in the right base. Mastoid roentgenograms were negative. A tuberculin test was negative.

Course in hospital. The child was given 125 mg. of

Chloromycetin Palmitate orally every six hours. The temperature continued to spike to 103° F. On June 5, it was noted that the cervical nodes were more predominant on the right side, and, on examination of the pharynx, the right retropharyngeal area was markedly swollen. The child also kept his neck in hyperextension, the position of comfort, and had a great deal of pain on rotating his neck to the left. A lateral roentgenogram of the neck was taken which showed a soft tissue swelling in the prevertebral region which was felt to be compatible with a retropharyngeal abscess (figures 1 and 2).

An otolaryngologist was consulted, and, on June 6, under Pentothal anesthesia with intubation in head down position, the abscess was incised and approximately 5 cc. of thick pus was obtained. A sinus tract extended up to and behind the right tonsil. On culture, the purulent material proved to be hemolytic streptococci which were sensitive to all antibiotics except streptomycin.

On June 7, the patient was much improved, and the white blood cell count was 9,350 per cubic millimeter. On June 10, the child was discharged after receiving 1.2 million units of Bicillin intramuscularly. He had a tonsillectomy and an adenoidectomy performed on October 13, 1958, without incident. A repeat cervical spine roentgenogram proved negative at this time (figure 3).

Past history. The past history reveals the fact that the patient had been hospitalized at the age of 6 months because of an upper respiratory infection, which had lasted for five days, and also a fever and cough. He was seen in the office, and examination of the mouth was extremely difficult because of the patient's resistance. Greenish purulent material came from the mouth following examination with a tongue blade. The temperature was 102.8° F. He was then taken to the hospital where a chest x-ray showed increased markings in the right base. A lateral roentgenogram of the neck demonstrated that the prevertebral soft tissue in the pharynx was much thicker than normal (figure 4). A throat culture grew out gamma streptococci which were sensitive to Aureomycin. He made a satisfactory recovery under treatment with 50 mg. of Aureomycin given orally four times a day. In retrospect, it was felt that he had had a retropharyngeal abscess which was inadvertently ruptured in the office during examination.

INCIDENCE

Retropharyngeal abscess is a relatively rare condition. In the preantibiotic era, there were 94 cases of the disease in approximately 73,000 admissions to the Toronto and St. Louis Children's Hospitals, an incidence of 0.13 per cent.¹ Since the advent of antibiotics, the incidence of the disease has declined.²

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Fig. 1. Lateral roentgenogram of neck showing soft tissue swelling in the prevertebral region.



Fig. 2. Another lateral roentgenogram of neck also showing soft tissue swelling in the prevertebral region.



Fig. 3. Roentgenogram of the neck which was negative.



Fig. 4. Lateral roentgenogram showing much thicker prevertebral soft tissue in the pharynx than is normal.

We reviewed the pediatric admissions to Asbury, St. Barnabas, and Swedish hospitals, Minneapolis, for the past ten years and were able to find records of only 2 other cases. One of these was a 24-month-old male, and the other was a 7-week-old male. In both cases, the abscesses were incised, but, because of extensive laryngeal edema, tracheotomies were necessary.

PATHOLOGIC ANATOMY

The retropharyngeal space is a potential space bounded anteriorly by the pharyngeal mucosa, posteriorly by the prevertebral fascia, superiorly by the base of the skull, and inferiorly by the cervical fascia. Laterally, the boundary is the carotid sheath, and, medially, the boundary is the median raphe.³ In infancy, there are 8 to 10 lymph nodes on each side in this space, but the nodes atrophy at about 3 years of age, although 1 to 2 lymph nodes always remain. Because of the lymph node atrophy, most cases, including 94 per cent of Bocai's series⁴ and 98 per cent of Brennemann's series,⁵ occur under the age of 3 years.

The abscess develops following pharyngitis in which the infection spreads to the retropharyngeal lymph nodes. The abscess may also follow a suppurative otitis media or foreign body injury to the pharyngeal mucosa, such as might occur after swallowing fish or chicken bones or chips of glass or metal.⁶

SYMPTOMS

The symptoms of retropharyngeal abscess are fever, pain on swallowing, occasional drooling, dyspnea with noisy respirations, and occasional torticollis with the head held in hyperextension, the position of greatest comfort. Cervical adenitis is also present and may be unilateral or bilateral.⁷ According to Deering and Brennemann,⁵ the 4 cardinal signs are an infection in the throat, pain on swallowing, localized swelling in the throat, and predominantly unilateral cervical adenitis.

DIAGNOSIS

On oral inspection, the examiner notes a unilateral pharyngeal mass. Laryngoscopy may be necessary if the mass extends into the larynx. The mass may be palpated in the pharynx with a tongue blade holding the jaws apart. Gentleness is necessary because the mass may be ruptured while examining it.

A lateral x-ray of the neck is often helpful when one can demonstrate a soft tissue prevertebral mass impinging upon the pharynx.^{8,9}

COURSE OF UNTREATED ABSCESS

If left untreated, the abscess may do several things. First, it may rupture spontaneously into the pharynx. This happened in 30 out of 82 cases in Deering and Brennemann's series.⁵ However, there is great danger of asphyxia, pneumonia, or lung abscess. Second, the abscess may burrow laterally through the tissues in the neck and point in either the anterior or posterior triangle. This calls for external incision and drainage. Third, the abscess may burrow into the posterior mediastinum. Fourth, the abscess may burrow into the carotid sheath and cause hemorrhage, septicemia, or thrombosis, all of which may be rapidly fatal.³

TREATMENT

Following diagnosis, the abscess should be incised and drained under suction. Inhalation anesthesia should not be used.³ Some authors recommend having the patient sit up with the teeth held apart by tongue blades. A sharp forceps is then slid along the examining finger, and the abscess is quickly incised and the forceps spread apart. Immediately, the child's head is held downward and continuous suction applied.⁵ Other authors recommend incising and suctioning the abscess with the head in a dependent position.³ A tracheotomy may be necessary if laryngeal edema is extensive. Antibiotics should be used and selected on the basis of cultures from the pharynx and pus drained from the abscess. Oxygen and humidity are often valuable adjuncts to therapy.

SUMMARY

A case of recurrent retropharyngeal abscess has been discussed and the literature reviewed. This relatively rare condition must be kept in mind when dealing with a child with a sore throat.

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Paradione Nephrosis

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IT IS WELL RECOGNIZED that the nephrotic syndrome can occur as the result of exposure to various toxic agents. The "dione drugs" are often cited in this respect, but search of the literature reveals only 3 references¹⁻³ to nephrosis as a complication of Paradione therapy, and only one of these records observations during the acute phase. We wish to record a study of a case of a patient in whom nephrosis developed following the administration of Paradione who was treated with a methylated metisteroid (Medrol).

CASE HISTORY

M.S., 6-year-old white male, was admitted to the Children's Hospital, Winnipeg, in June 1958.

He was mentally retarded, possibly due to cerebral agenesis. He suffered from minor motor seizures and had been receiving phenobarbital for over three years. In July 1956, he was first given 0.6 gm. of Paradione daily. The drug was continued until his admission to the hospital. In March 1958, an urticarial eruption developed, and phenobarbital was discontinued. His urticaria persisted, however, despite the use of antihistamines.

In June 1958, it was noted that his face and eyelids were swollen. The swelling rapidly spread to involve his whole body and was associated with diminished urinary output.

He was admitted to the hospital on June 29, 1958. Examination on admission revealed a markedly edematous white male of average stature for his age. His blood pressure was 120/80; fundi were normal; and no other physical abnormalities were detected.

Investigations revealed hemoglobin, 12.9 gm. per cent; erythrocyte sedimentation rate, 38 mm. per hour; packed cell volume, 44 per cent; urinalysis, specific gravity of 1.040; and albumin, 3,000 mg. per cent, no other abnormal constituents and no cellular deposits. Serum proteins totaled 3.9 gm. per cent. Albumin was 1.8 gm. per cent; globulin, 2.1 gm. per cent; blood urea nitrogen, 16 mg. per cent; serum sodium, 144 mEq. per liter; potassium, 4.7 mEq. per liter; serum chloride, 100 mEq. per liter; serum cholesterol, 300 mg. per cent; serum glutamic oxalic transaminase, 42 units; serum glutamic pyruvic transaminase, 24 units; urine sodium, 5.2 mEq. per liter; and urine potassium, 196 mEq. per liter.

Tests for antibodies against Paradione and human kidney were negative. A diagnosis of nephrotic syndrome due to Paradione sensitivity was made. Paradione was stopped. Treatment with 20 mg. of Medrol every twenty-

four hours was commenced on the third hospital day. A fall in albuminuria to 2,000 mg. per cent was detected on the seventh hospital day and was associated with a fall in the urine potassium level. Diuresis commenced on the eleventh day. From the twelfth day until his discharge from the hospital, his urine contained less than 20 mg. per cent of albumin per 100 cc. These features are shown graphically in figure 1.

Six weeks after discharge from the hospital his urine was free of albumin. Serum proteins were 7 gm. per cent; albumin was 5 gm. per cent; and globulin was 2 gm. per cent. Medrol was slowly reduced and finally stopped September 9 after nine weeks. Nephrosis has not recurred.

DISCUSSION

Contemporary theory of the pathogenesis of the nephrotic syndrome places the primary lesion within the basement membrane of the glomerulus.⁴ As a result of this damage to the glomerular filter, protein, mainly albumin and gamma globulin, escapes into the renal tubules where reabsorption is inadequate to compensate for the glomerular loss, and large amounts of protein appear in the urine. The subsequent chain of events produces the characteristics of the syndrome. The albuminuria leads to hypoproteinemia with its resultant lowering of the plasma osmotic pressure and a diminished volume of fluid within the vascular space.⁵ The diminished circulating volume produces increased aldosterone activity with resulting sodium and water retention and increased potassium excretion.

These events lead to generalized edema.⁶ The lowered serum albumin accounts for the hypercholesterolemia⁷ by impairing plasma clearing of lipids.

Although this is an attractive theory, reversal of events by minor alterations of serum oncotic pressure places the aldosterone mechanism in some doubt.⁸ One hypothesis for the mechanism of the initial glomerular damage proposes that this may be an auto-immune response in which Paradione or one of its metabolites renders the kidney antigenic. We have studied this possibility using the Boyden technic but could not clearly demonstrate antibodies to human kidney tissue or Paradione. Alternatively, the Paradione itself may damage the glomerulus. However, the fact that the patient had been taking the drug for two years prior to the development of the syndrome

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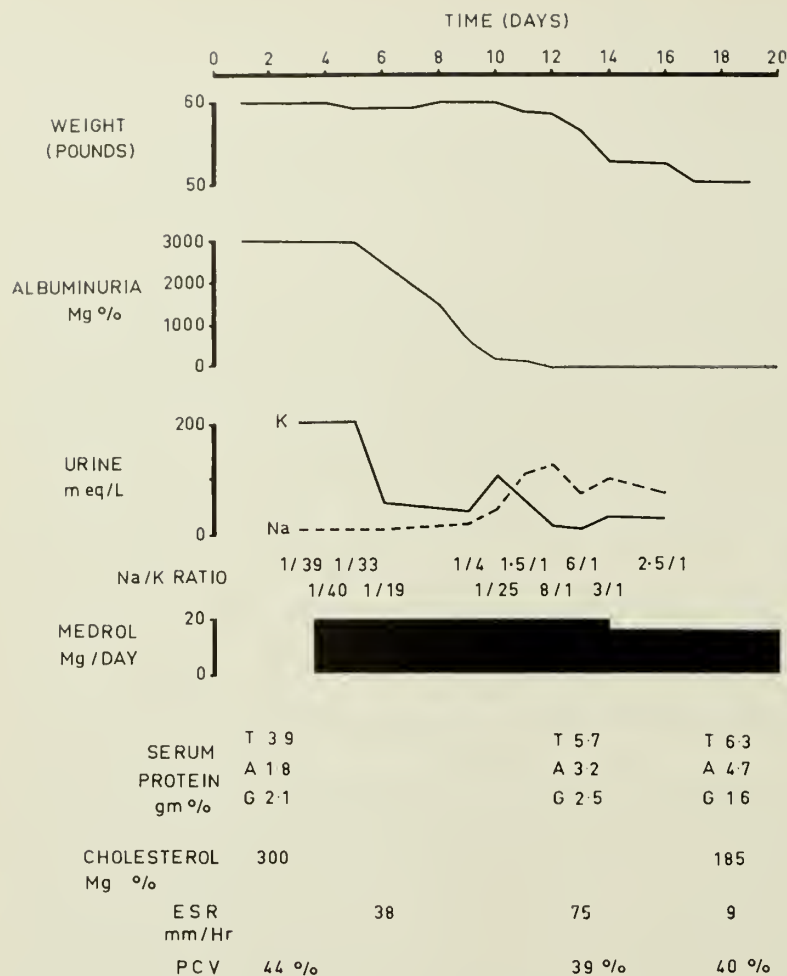


Fig. 1. Diagrammatic representation of significant biochemical changes in the case of a patient with Paraldione nephrosis treated with Medrol.

argues against this concept, and the rapid reversal of the disease by steroids would argue more for an antigen-antibody mechanism. Unfortunately, no renal biopsies have been performed in cases of Paraldione nephrosis, so that one cannot pinpoint the pathology in the drug nephrosis as has been done in idiopathic nephrosis by Vernier and associates. Of the experimental nephroses, that caused by aminonucleoside is the type that mimics idiopathic nephrosis most closely. Little chemical correlation exists between this drug and Paraldione. Aminonucleoside nephrosis is not regarded as involving an immune mechanism.⁹

Finally, the investigating technic utilized would indicate that, prior to the sixth hospital day, there was a marked aldosterone effect. This is evident by the sodium-potassium ratio and the hematocrit. On the eleventh day, a reversal of the sodium-potassium ratio occurred with a rise in sodium excretion, indicating diminishing aldosterone activity. This was accompanied by a fall in the hematocrit, suggesting a filling of the in-

travascular space suppressing the stimulus to aldosterone production.

It has been argued that the administration of steroids in the "dione nephroses" does not initiate the remission but that it occurs as the result of discontinuing the drug.³ While one cannot prove that steroids did induce the remission in this case, the timing of the remission after steroids were administered closely parallels that occurring in "idiopathic nephrosis" so treated. Future elucidation of the pathogenesis of the drug nephrosis will depend a great deal on adequate microscopic study of biopsy material obtained during the acute stage and during healing.

Medrol was supplied for this study by the Upjohn Co., Kalamazoo, Michigan.

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IN THE TREATMENT OF infants with high concentrations of bilirubin in the serum, administration of glucuronic acid or sodium glucuronate is not an alternative for exchange transfusions. The acid or its sodium salt was given orally or intravenously in varying amounts to 14 icteric infants without blood incompatibility. No significant change in concentration of bilirubin in the serum occurred.

Nonconjugated bilirubin in the serum must be converted to bilirubin glucuronide for excretion in the bile. Experimental evidence, as well as the in vivo observations, suggests that formation of glucuronide is not enhanced by administration of glucuronic acid.

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RUPTURE OF AN OVARIAN FOLLICLE or corpus luteum can often be accurately diagnosed by culdoscopic examination.

Rupture of an ovarian follicle is rare, and symptoms are frequently so slight and transitory that medical attention is not sought. In most instances, patients require only observation and analgesic medication. In the occasional patient, culdoscopic examination, rather than exploratory laparotomy, permits gross identification of the lesion and excludes other adnexal disorders.

Rupture of a corpus luteum may require surgical attention. However, in many patients in whom symptoms are not extreme, culdoscopic examination may be used to establish diagnosis. With other pelvic diseases excluded, complete recovery is possible with conservative management.

Of 15 surgical service patients, 9 had proved follicular and 6 had proved luteal rupture. All were treated surgically.

Of 17 gynecologic service patients, 8 had follicular and 9 had luteal rupture diagnosed by culdoscopic examination. Only 2 women with ruptured corpora lutea were treated by laparotomy after culdoscopic examination.

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Pulmonary Congestion and Edema as a Complication of Acute Nephritis in Childhood

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PULMONARY EDEMA is an uncommon, though serious, complication of glomerulonephritis in children. Because we could not find a report of the incidence of this complication in pediatric patients with nephritis, we examined the records of all children with acute or chronic glomerulonephritis seen at the Mayo Clinic in the years 1950 through 1957 to ascertain the frequency and clinical course of this complication. In this eight-year period, 89 cases of acute nephritis and 4 cases of chronic nephritis were encountered. Excluded from this group are all types of nephritis except postinfectious nephritis. Table 1 shows the various complications and the number and per cent of cases for each. Pulmonary edema occurred in 5 of the 93 cases, an incidence of 5 per cent. The cases encountered at the clinic may differ from those encountered in the practice of pediatrics in other communities in view of the serious condition of some of the patients with nephritis referred to this clinic.

REVIEW OF THE LITERATURE

The pathophysiologic factors involved in the production of pulmonary congestion and edema complicating nephritis have been the subject of much dispute and confusion in the literature. In 1934, Roubier and Plauchu¹ reported x-ray changes in the lungs of 4 patients with azotemia. These authors referred to the changes appearing in the roentgenograms as "uremic pneumonia." Rendich and co-workers,² in 1941, in presenting 6 cases of patients in whom azotemic lungs were diagnosed, concluded that the levels of blood urea and the pulmonary changes were not parallel and that these changes occurred in only a

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TABLE 1
COMPLICATIONS OF NEPHRITIS IN 93 CHILDREN SEEN AT
THE MAYO CLINIC 1950-1957 inclusive

Complications	Cases	Per cent
Azotemia	49	53
Hypertension	41	44
Encephalopathy	9	10
Oliguria	17	18
Pulmonary edema	5	5
Death	7	8

small percentage of patients with azotemia. These investigators postulated that roentgenographic changes in azotemia were produced by "stasis of the blood in the large pulmonary vessels with transudation and exudation into the interstitial and alveolar spaces from a toxic substance acting on the endothelial linings of the blood vessels."

In 1947, Doniach³ reviewed 5 cases of azotemia and pulmonary changes and studied the pathologic changes in the lungs in 4. He noted that the distribution of the edema was similar to that associated with uncomplicated acute failure of the left ventricle. Doniach's necropsy material showed widespread solid edema in the lungs due to a fibrinous or albuminous intra-alveolar exudate. There was an associated mononuclear cell reaction and fibrinous organization, and the alveolar ducts were lined with hyaline membranes. In Doniach's opinion, the exudate resulted from a rise in pressure in the pulmonary capillaries consequent to left ventricular failure plus alteration in the capillary permeability resulting from the azotemia, but he did not consider the lesion specific because of the similarity to the pneumonia associated with rheumatic fever. Doniach⁴ stated in 1949 that heart failure was the primary cause of this complication but that concurrent azotemia, anemia, and infections of the respiratory tract modified the intensity of the pulmonary picture.

In 1948, Barden and Cooper⁵ also suggested that vascular permeability played an important role in this condition. Bass and Singer,⁶ in 1950, observed that the clinical findings on some of their 5 patients were less than would be expected from the x-ray picture. They noted too that the pulmonary shadows disappeared as the left ventricular failure was alleviated.

In 1953, Alwall and associates,⁷ who assumed that this condition was due to retention of fluid, reduced the fluid intake of patients having pulmonary edema complicating nephritis to a daily minimum and induced diarrhea by means of a 25 to 50 per cent solution of sodium sulfate given either orally or by proctoclysis and correlated the reduction of body weight with a regression of the pulmonary changes. No relationship was noted between the x-ray findings and the concentrations of serum bicarbonate or urea. They then ligated the ureters of rabbits and infused Ringer's solution intravenously in an amount equal to 15 per cent of the body weight. One to two days later, roentgenograms of the thoraces of the rabbits showed changes similar to changes seen in the roentgenograms of the lungs of patients with azotemia. These pulmonary changes subsided after ultrafiltration and did not reappear despite progressive azotemia, which led to terminal uremia and death. These workers proposed the term "fluid lung" rather than "azotemic" or "uremic lung," since the former more adequately indicated the etiologic aspects of the complication.

In 1956, DePass and co-workers⁸ presented their experience with 6 cases and concluded that the roentgenographic findings represented pulmonary congestion and edema. They postulated that retention of fluid, varying degrees of cardiac failure, and, often, superimposed infections as well as an increase in respiratory rate entered into the formation of the clinical picture. They advocated abandonment of such terms as "pulmonary azotemia," "uremic lung," "fluid lung," and "uremic pneumonia."

Nemir and Beranbaum,⁹ in 1958, presented the findings in the case of a 10-year-old boy and suggested that arteritis might have played a role in the production of pulmonary edema in the course of uremia.

CLINICAL ASPECTS

Clinically, pulmonary congestion and edema as a complication of nephritis can be acute and fulminating with all the signs and symptoms of cardiorespiratory embarrassment, or it can be insidious, producing few, if any, clinical findings. Pulmonary edema may be transient and may sub-

side rapidly as the general condition of the patient improves, or it may lead rapidly to death. The fact that the edema can be subacute, with few clinical findings, may explain, in part, why this condition is so rarely recognized. Not infrequently, the physician's attention is first drawn to this complication when the characteristic picture is presented on routine roentgenologic examination of the lungs.

Roentgenographically, pulmonary congestion and edema of the lungs appear as symmetrical, irregular, and diffuse areas of increased density located centrally or basally. The changes occur as a result of the intra-alveolar edema and congestion and dilatation of the pulmonary blood vessels. Either of these processes may predominate. If the change is primarily due to intra-alveolar edema, the affected regions may appear nodular, simulating metastatic or inflammatory pulmonary lesions. If vascular congestion and dilatation predominate, a picture of generalized hypervascularization not unlike that seen in uncomplicated left ventricular cardiac decompensation is present. The tendency of the changes to be centrally located probably explains the frequency with which they remain clinically silent.

In 1958, Nemir and Beranbaum⁹ stated that this condition must be differentiated roentgenographically from such widely dissimilar diseases as sarcoidosis, chronic miliary tuberculosis, cystic fibrosis of the pancreas, parenchymal inflammatory diseases, and neoplastic infiltration.

CASE REPORTS OF ACUTE NEPHRITIS

Case 1. A 13-year-old white boy, who was admitted to the hospital on April 12, 1957, gave a history of rhinitis, headache, and puffiness of the face for twenty-four hours. An episode of pharyngitis three weeks previously had been treated with Achromycin for three days.

On admission, the boy was pale but in no distress. His face was edematous, and he was oliguric. Blood pressure was 130 mm. of mercury systolic and 70 diastolic; respiratory rate was 20 per minute; pulse rate was 70 beats per minute; oral temperature was 99° F.; and weight was 99 lb. Laboratory studies gave the following values: urine had a specific gravity of 1.022, was acid in reaction, did not contain sugar but did contain albumin, grade 3; casts, grade 1; erythrocytes, grade 3; and leukocytes, grade 1. The value for hemoglobin was 11.2 gm. per 100 cc. of blood, and the leukocyte count was 7,700 with a normal differential. The antistreptolysin titer was 1,250 Todd units. The sedimentation rate was 32 mm. in one hour (Westergren method). The value for blood urea was 102 mg. per 100 cc. The values for serum electrolytes were: sodium 132, potassium 5.4, chlorides 107.8, and carbon dioxide combining power 19.6 mEq. per liter. The concentration of creatinine in the blood was 1.3 mg. and of serum proteins, 5.5 gm. per 100 cc. The usual flora grew on culture of the throat. The roentgenogram of the thorax on admission (figure



Fig. 1 (case 1). Thorax on admission. Bilateral, radiating areas of density with a slightly granular appearance. Heart is normal in size.

1) showed bilateral, radiating densities with slight granularity over both lung fields and a heart of normal size.

The boy was placed at rest in bed and sedated and given penicillin by mouth. A low salt diet was instituted. The fluid intake was prescribed according to his thirst. On the second day in the hospital, rales could be heard posteriorly over both lung bases, but, by the next day, the lungs were once again clear to auscultation (figure 2a). Because the blood pressure started to rise, 1 mg. of reserpine (Serpasil) was given intramuscularly every four hours as needed to stabilize the blood pressure. Bradycardia continued throughout the patient's stay in the hospital. He remained oliguric until diuresis began on the fourth hospital day with a concomitant loss of body weight, decrease of urea, and clearing of the lungs as indicated in figure 2b. The low salt diet was maintained until diuresis was fully established, after which a general diet was allowed. Appetite and thirst always dictated the patient's intake of food and fluid (figure 3). He was dismissed to be followed by his private physician.

Re-examination at the clinic four months later disclosed that the patient was free of symptoms and enjoying full activity. Urine then had a specific gravity of 1.032, was acid in reaction, and contained no sugar or casts but did contain albumin, grade 1, and erythrocytes, grade 1. The value for hemoglobin was 13.0 gni. per 100 cc. The sedimentation rate was 12 mm. in one hour, and the value for serum protein was 7.0 gni. and 40 mg. per 100 cc. for urea. Since then, the boy has completely recovered.

Case 2. An 8½-year-old white boy, who was seen at our clinic on March 19, 1953, had a history of puffi-



Fig. 2 (case 1). Thorax. (a.) On the third day in the hospital, conditions were essentially the same as shown in figure 1. (b.) On the seventh day after admission, diuresis was firmly established and clearing of pulmonary changes is evident.

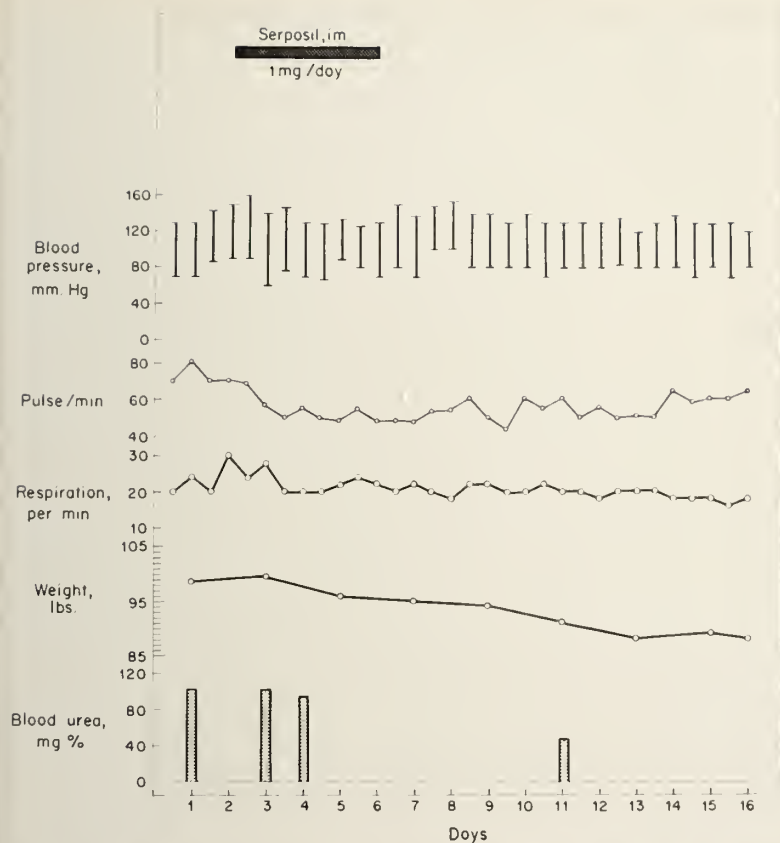


Fig. 3. Laboratory data and hospital course in case 1.



Fig. 4 (case 2). Thorax on admission showing some engorgement of hilar vessels and fluid in the costophrenic angle bilaterally. Cardiothoracic ratio is 51 per cent.



Fig. 5 (case 3). Fine radiating areas of density with a slightly granular appearance in both lung fields at time of admission. Heart is normal in size.

ness of the eyelids, edema of the hands and feet, anorexia, paleness with a waxy complexion, and a low fever of five days' duration. He had complained of fullness of the abdomen, a nonproductive cough, and "dark urine" for four days. The parents did not know of any diminished urinary output during the five days of illness. On examination, he was pale but in no distress. He had minimal pretibial pitting edema and puffy eyelids. Blood pressure was 162/136, pulse rate was 80 per minute, respiratory rate was 20 per minute, and oral temperature was 99° F. His weight of 66½ lb. was an increase of 3 lb. over his usual weight. Urinalysis showed specific gravity of 1.006, an acid reaction, absence of sugar, grade 2 albumin, occasional casts, grade 3 erythrocytes, and grade 1 leukocytes. The value for hemoglobin was 11.6 gm. per 100 cc. of blood. The leukocyte count was 5,400, and the differential count was normal. The sedimentation rate was 41 mm. in one hour (Westergren method). The value for blood urea was 30 mg. per 100 cc.; for serum protein, 6.39 gm. per 100 cc.; and for serum potassium, 4.8 mEq. per liter. A roentgenogram of the thorax showed some engorgement of the hilar vessels and fluid in both costophrenic angles (figure 4). The cardiothoracic ratio was 51 per cent.

The parents chose to return home that same day, and the patient was dismissed to the care of the family physician. When he returned for re-examination two months later, he was free of symptoms and was enjoying moderate activity. Urinalysis showed specific gravity of 1.007, an acid reaction, absence of sugar, albumin, and casts, and hematuria of grade 1. The value for hemoglobin was 12.2 gm., and the sedimentation rate was 12 mm. in one hour.

Case 3. A 7-year-old white girl with a history of hematuria, albuminuria, and headaches for three months was admitted to the hospital on January 1, 1951. The week before admission, she had been hospitalized in her home locality and had received 4 transfusions of whole blood of 250 cc. each twenty-four hours apart for correction of anemia. Shortly after the last transfusion, the pulse rate and respirations became rapid. A roentgenogram of the thorax revealed pulmonary edema. The patient was given 1 mg. of digitoxin (Purodigin) intramuscularly and was referred to the clinic.

On admission, the child was acutely ill. She was pale and had facial and pretibial edema. Blood pressure was 170/120; pulse rate was 120 per minute; and rectal temperature was 101.4° F. She was dyspneic, anorectic, and oliguric. Except for the dyspnea, the heart and lungs were negative to physical examination. The urine had a specific gravity of 1.008, an acid reaction, and contained albumin, grade 4; no sugar; casts, grade 1; and erythrocytes, grade 3. The value for hemoglobin was 9.6 gm. The sedimentation rate was 96 mm. in one hour (Westergren method). The value for blood urea was 116 mg. per 100 cc. The roentgenogram of the chest made on admission showed evidence of pulmonary edema and a heart of normal size (figure 5). After an initial temporary response to treatment, pronounced oliguria developed, and death occurred on the twenty-second day in the hospital.

UNDERLYING MECHANISM OF PULMONARY EDEMA IN ACUTE NEPHRITIS

At one time or another, various factors have been implicated as playing a major role in the production of the pulmonary changes associated with acute glomerulonephritis. As more precise

clinical and laboratory investigations have been made on these patients, it has become evident that the changes are those of pulmonary congestion and edema. Further studies have suggested that this congestive state may be renal rather than cardiac in origin.

In 1944, Lyons and associates¹⁰ demonstrated that the administration of sodium and water to normal subjects in amounts that overcome their excretory capacities leads to an increase in weight, blood volume, and venous pressure.

Cardozo¹¹ reported in 1946 that he had observed a low red cell volume and values of serum proteins in 18 cases of acute nephritis. In 5 of these cases, he determined the plasma volume by the Evans blue method before and after diuresis and, in 4 patients, found that it decreased greatly after diuresis. In 1950, Roscoe¹² carefully followed 40 patients with acute nephritis with serial erythrocyte counts, hematocrit readings, and determinations of hemoglobin and plasma proteins. She found evidence of increased plasma volume during the edematous phase and of decreased plasma volume when diuresis occurred. She studied 1 of these patients by the Evans blue method and found good correlation between the plasma volume determined by this method and that obtained by other methods.

In recent years, evidence has been increasing that clinical manifestations similar to those seen in congestive heart failure may occur in association with retention of fluid of noncardiac origin. That overdosage of desoxycorticosterone acetate may produce edema, cardiac enlargement, pulmonary congestion and edema, and increased venous pressure is a commonplace clinical observation. In 1950, Friedberg¹³ reported on 4 cases of lower nephron nephrosis secondary to carbon tetrachloride intoxication in which the full-blown picture of congestive heart failure and pulmonary edema developed. He postulated that excessive intake of salt and water in the face of a diminished excretory capacity by the kidneys accounted for this complication.

In 1950, Gimbel and co-workers¹⁴ studied the metabolic and cardiovascular effects of prolonged intravenous administration of serum albumin. They found that in healthy young men receiving as little as 50 mg. of albumin intravenously daily for one week, the plasma volume increased, and clinical signs of pulmonary edema and congestive heart failure developed.

In 1955, Albert and associates¹⁵ induced marked retention of fluid in 4 of 20 noncardiac patients given ACTH and cortisone. In addition to pronounced gain in body weight, slight venous con-

gestion, dyspnea on exertion, orthopnea, increase in size of the heart, and congestive changes in the lungs developed in 3 of these 4. As studied by cardiac catheterization, the associated hemodynamic changes of elevated right atrial, right ventricular, and diastolic pressures and increase in blood volume were similar to those of congestive heart failure. However, unlike congestive heart failure, cardiac output and differences in oxygen saturation of arterial and venous blood remained normal. One of the patients received digitalis intravenously and subsequently by mouth without any effect on the elevated venous pressure, initiation of diuresis, or relief of symptoms, such as would be expected in a patient with congestive heart failure. Albert and co-workers¹⁵ concluded that the hemodynamic state associated with marked fluid retention is a noneardiac circulatory congestion differing from congestive heart failure in the absence of failure of the heart.

La Due,¹⁶ in 1944, and Peters,¹⁷ in 1953, demonstrated that in cases of nephritis with evidence of heart failure, the circulation time is normal. This is in contradistinction to the classic congestive heart failure in which circulation time is prolonged. In 1951, Davies¹⁸ presented 5 cases of acute glomerulonephritis with raised venous pressures in patients who were studied by cardiac catheterization. In all, the cardiac and stroke output were normal. This is in contradistinction to congestive heart failure in which both the cardiac and stroke output are diminished. In 3 of his patients, he recorded blood pressure, body weight, fluid balance, and venous pressure, noting that the signs of "heart failure" disappeared when diuresis was established. He concluded that in nephritis, the cause for venous congestion, rise in venous pressure, edema, cardiac enlargement, and pulmonary edema may be attributed to retention of water secondary to renal damage.

In 1957, Farber¹⁹ reported on a study of 5 patients with acute nephritis who had signs and symptoms usually considered to be those of congestive heart failure. He studied the cardiorenal hemodynamics and measured the excretion of electrolytes. All patients exhibited an increase in right atrial pressure with normal cardiac output. In 4, the difference in oxygen in arterial and venous blood was normal. In 1, it was elevated, a finding characteristic of heart failure. The rate of glomerular filtration and the renal plasma flow were reduced in all. Low filtration fractions characteristic of patients with nephritis were found in all of his patients, in contrast to the finding of elevated filtration fractions in pa-

tients with congestive heart failure. Three of his patients received *Digitalis lanata* (Digoxin) intravenously without decrease in right atrial or venous pressures or increase in cardiac output or diuresis of sodium and water. Farber concluded that the signs and symptoms usually attributed to congestive heart failure in acute nephritis are due to venous and pulmonary congestion and are associated with retention of salt and water and not with heart failure.

The main etiologic factor in edema of the lungs in these patients with nephritis, therefore, was hypervolemia. With the aberrations in renal function resulting from the widespread involvement of the kidneys by the lesions of nephritis, retention of water and solutes ensues. In nephritis, there is a glomerulotubular dissociation, so that glomerular filtration is decreased while tubular function remains relatively unimpaired. This leads to retention of salt and water and a consequent increase in blood volume. Injudicious administration of fluids as well as indiscriminate blood transfusions may increase the volume of blood further. This increase in blood volume can lead to dilatation and congestion of the pulmonary blood vessels, with increase in the hydrostatic pressure and transudation of fluids into the interstitial and intra-alveolar spaces. Hypervolemia, singly or in combination with other factors, may lead to varying degrees of left ventricular heart failure further aggravating the pulmonary congestion and edema.

This is the mechanism that seems to have been involved in the causation of the pulmonary congestion and edema in our 3 patients with acute nephritis. In case 1, salt and water were retained as evidenced by an increase in body weight and edema. The fact that the values of hemoglobin and serum proteins were low so early in the course of the disease suggested a relative decrease secondary to hemodilution. On examination of the patient four months later, these values were well within normal limits. Although, on admission, the patient clearly showed roentgenologic evidence of pulmonary congestion and edema, he presented no other clinical evidence of congestive heart failure. Thus, this complication can be silent and should be suspected and looked for in all patients with acute nephritis even in the absence of signs or symptoms of cardiorespiratory embarrassment. With the establishment of diuresis, there was a loss of body weight, a decrease in edema, and a clearing of the pulmonary picture.

In case 2, the report that the roentgenogram of the chest showed evidence of pulmonary congestion, bilateral hydrothorax, and slight increase



Fig. 6. Thorax of a 13-year-old girl on admission who had had chronic glomerulonephritis for four years. Extensive patchy areas of density involve most of the right lung and upper two-thirds of the left. Heart is enlarged. Child did not respond to treatment and died on the ninth hospital day. Necropsy revealed pulmonary edema.



Fig. 7. Thorax of a 7-year-old girl on admission. She had had chronic glomerulonephritis for one and one-half years and tubular insufficiency for two months. Fine radiating areas of density and a granular appearance in both pulmonary fields. Heart is enlarged. She responded poorly to treatment and died six days after admission.

in size of the heart came as a surprise to us because, at the time of examination, we found no clinical evidence of cardiorespiratory embarrassment. The parents chose to take the patient home on the day of examination; therefore, we could not follow his progress. On re-examination two months later, we found only minimal evidence of a urinary disturbance.

In case 3, signs and symptoms of pulmonary edema and "heart failure" developed shortly after the last of 4 transfusions of 250 cc. of whole blood had been given at twenty-four-hour intervals. The conditions prevailing at the time of the blood transfusions are not entirely known to us, but the circulation, already congested from the hypervolemia consequent to acute nephritis, may have been overburdened by the transfusions. This emphasizes the fact that careful and judicious consideration is needed before transfusions of blood are used to correct anemia, and they should not be carried out while the patient is oliguric and in a state of hypervolemia. The child did not respond to treatment and, after a stormy hospital course, died. Necropsy was refused by the parents, so that we lack an anatomicopathologic study to confirm our impression.

COMMENT ON THE COMPLICATION IN CHRONIC NEPHRITIS

To demonstrate the variable roentgenographic appearance of this complication, roentgenograms of the thorax of our 2 cases of pulmonary congestion and edema complicating chronic glomerulonephritis are presented in figures 6 and 7. Whether the same pathophysiologic process that has been proposed to account for this complication of acute nephritis holds true for the chronic form cannot be stated with certainty. A combination of the renal congestive state, resulting from the marked oliguria with retention of water and salt, and congestive heart failure, resulting from the longstanding hypertension, probably accounts for this complication in the terminal stages of chronic nephritis. At present, we are in the process of studying serum osmolarity, blood volume, and cardiorenal hemodynamics in patients with both the acute and chronic forms of glomerulonephritis in an effort to arrive at a more conclusive physiologic explanation.

TREATMENT

In the treatment of pulmonary edema complicating acute nephritis, recognition of the fact

that the basic pathophysiology is hypervolemia caused by the retention of salt and water is of the utmost importance. Consequently, the most important therapeutic measure is the regulation of the intake of these two substances. Various surveys have demonstrated that the normal intake of sodium chloride may range from 2 to 30 gm. when the diet is not restricted. These figures vary with the age group and dietary peculiarities of the subjects under study. When it is realized that, in children, 90 to 98 per cent of the ingested sodium is excreted through the kidneys and that nephritis impairs the sodium excretory capacity of the kidneys, it becomes obvious that the intake of sodium should be restricted to as near zero as is palatably possible. In our practice, we maintain our patients on a diet containing 0.2 to 0.5 gm. of sodium chloride per day until diuresis is firmly established. Water is restricted to the amount necessary to replace the insensible losses plus the output of urine.

In acute nephritis, a mild and transitory acidosis is present, which results from the retention of inorganic acids; and hyponatremia, hypochloremia, hypoproteinemia, and anemia, which result from the dilution by the hyperhydremia, occur also. All of these changes are transitory in nature and promptly return to normal as renal function improves and diuresis ensues. Only on occasions, and then only when the anuria is prolonged and severe, will they be of sufficient magnitude to require therapeutic intervention. Therefore, any efforts toward correcting these mild and transitory changes by means of fluids given intravenously and blood transfusions are to be deplored, as they would only result in overburdening an already congested circulation.

Experimentally, digitalis has been found to be of little help in relieving the congestive states of noncardiac origin. Its use should be limited to cases in which the pulmonary congestion and edema are severe and threaten life or in which congestive heart failure coexists as evidenced by an increased circulation time.

Tourniquets, phlebotomies, oxygen, and morphine are used if necessary. Use of mercurial diuretics is, of course, contraindicated.

SUMMARY

Pulmonary congestion and edema complicated nephritis in 5 per cent of the children with nephritis who were seen at the Mayo Clinic from 1950 to 1957, inclusive. The literature on the sub-

ject, the clinical and roentgenographic pictures, and 3 cases of pulmonary congestion and edema complicating acute glomerulonephritis have been presented. It has been suggested that hypervolemia is the main etiologic factor in this complication in nephritis and that varying degrees of left ventricular failure rarely contribute to the final picture. We would like to emphasize that this complication can remain clinically silent and that it should be suspected and looked for in every case of nephritis, even in the absence of evidence of congestive heart failure. Return of renal function effects diuresis and clearing of the pulmonary edema. Fluid allowances must be kept minimal, covering only insensible losses plus urinary output during the period of oliguria.

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Definition of AB Hemolytic Disease

A Preliminary Report

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THE CLINICAL MANIFESTATIONS of AB hemolytic disease are generally not severe. The infants are not usually anemic, and jaundice infrequently develops to a degree sufficient to place the infant's life in jeopardy. It is a disease which has been poorly defined by laboratory tests, partly because of the lack of knowledge concerning the antibodies responsible for damaging the infant's cells, and partly because the direct Coombs' reaction of the infant's red cells is usually negative with most techniques. Rosenfield¹ showed that if a sensitive method was used for the Coombs' reaction, a weakly positive result could be obtained in the majority of cases. It has been observed by Chown² that if the capillary method is used for the direct Coombs' test, many weakly positive reactions can be seen within the cells of newborn infants whose ABO blood groups differ from those of their mothers. Despite these positive Coombs' reactions, however, most of the infants followed an entirely normal clinical course during the early part of their life.

It is evident that clinical manifestations of hemolytic disease do not inevitably follow the sensitization of the infant's red cells to antibodies from the ABO blood group system. Since many hospitals are now performing Coombs' tests on the cells of all newborn infants, it is important to try to establish a method by which prognosis of the infant's clinical course can be attempted.

With this in mind, a study of group A and B infants born to group O mothers has been carried out. A sample of blood from the umbilical cord of the infant was tested for the direct Coombs' reaction by the capillary method,³ and attempts were made to elute anti-A and anti-B from the infants' red cells. The infants' sera were tested for the presence of anti-A and anti-B by the use

of Löw's papain⁴ and for the level of total bilirubin. In addition, a hemoglobin determination and a reticulocyte count were done on capillary blood from the infant at about 24 hours of age, and the babies were observed clinically during the first week of life.

The presence of a positive direct Coombs' reaction and/or the finding of anti-A or anti-B in eluates prepared from the infants' red cells was taken as evidence of "AB sensitization." Forty-five infants fell into this group, yet jaundice developed in only 14 of these babies during the first 24 hours of life. The only laboratory test on the infants' blood which gave evidence of the severity of sensitization was the presence of free homologous antibody in the infants' sera, that is, anti-A in a group A infant, and anti-B in a group B infant.

If the infants in the study were divided into the following groups, this finding can be readily shown: (1) free homologous antibody in the infants' sera—22 cases, (2) serologic evidence of A or B sensitization, that is, positive Coombs' test or positive eluate but no free homologous antibody—23 cases, and (3) serologically normal infants—55 cases.

In the first group, jaundice developed in 10 infants during the first 24 hours of life, while there were only 2 instances of such early jaundice in the other groups. Other evidence that the presence of free homologous antibody in the infants' sera is indicative of a more serious state is shown by the tendency of the hemoglobin values to be lower in group 1 than in group 2 or 3. The mean reticulocytic counts were higher in group 1, but there was such a wide spread of these values that little significance can be attached to this finding. Also, the values of the cord bilirubin were generally higher in group 1.

From this study, therefore, preliminary results indicate that A or B sensitization of newborn infants can be detected by means of the direct Coombs' test if this is done by the capillary method. The infant in whom jaundice is going to develop because of this sensitization usually has free homologous antibody in his serum. It

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should be noted, however, that even the presence of this antibody does not imply that clinical manifestations of AB hemolytic disease will follow

but only that the likelihood is greater than in those cases in which "AB sensitization" is found in the absence of antibody in the infant's serum.

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IN INFANTS WITH IDIOPATHIC HYPERCALCEMIA, the use of milk treated with sodium sulfate provides a simple, practical means of lowering serum calcium concentrations. Based on the average calcium content of milk, 8 gm. of sodium sulfate per liter is required for complete titration. However, the use of only 5 gm. is advised in order to avoid overdosage and diarrhea. Cessation of vitamin D therapy possibly contributed to the notable decrease in serum calcium and subsequent increase in appetite, alertness, and growth noted in a 4-month-old hypercalcemic infant a few days after institution of sodium sulfate therapy.

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INFECTION WITH COXSACKIE B VIRUS may be the cause of unexplained cardiac abnormalities, respiratory distress, fever, listlessness, and feeding difficulties soon after birth. The disease is of short duration, usually terminating in death within a week or complete recovery within two or three weeks. Age at onset and prognosis are not correlated. No specific treatment is available.

The general infection may be accompanied or preceded by febrile or respiratory symptoms in the mother. Tachycardia, cardiomegaly, electrocardiographic changes, and cyanosis are common. Central nervous system signs, including meningism, convulsions, pleocytosis, and hepatosplenomegaly occur in one-third of affected infants.

Infection with group B, type 4 Coxsackie virus was fatal in 2 infants. The virus was in high titer in myocardial tissue of both and in the spinal cord and liver of 1. Onset thirteen hours after birth suggested in utero infection in 1 instance. Inoculation of viruses from both patients into newborn mice produced destruction of the anterior horns of the spinal cord indistinguishable from that caused by poliomyelitis virus.

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Sclerema Neonatorum

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WITH THE ADVENT of chemotherapy, improved nutrition, and technologic developments, infant mortality has markedly declined in the past half century. However, it still the physician's responsibility to diagnose pathology and instigate proper therapy at once. This is particularly true in infants with sclerema neonatorum.

Sclerema neonatorum, as the name implies, is a hardening of the body tissues during the neonatal period. Although not a common disease, it is much more prevalent than the literature seems to indicate. The condition appears most frequently in premature or debilitated infants. Many of these patients have had difficulty initiating respirations or have had congenital cardiac abnormalities, overwhelming sepsis, or have become severely dehydrated. The skin and subcutaneous tissues of these newborns become firm and cold. This process usually begins over the buttocks, thighs, or trunk and then rapidly spreads to other areas of the body, with the exception of the palms, soles, and genitalia. The tissues assume a mottled appearance and cannot be lifted or moved over the underlying muscle and bone. The indurated areas take on a smooth waxlike appearance and do not pit on pressure. A hyperkinetic phase may precede actual skin changes and is characterized by pronounced irritability and prolonged crying. From this state, the infant may pass into a period of diminishing activity, refuse to suck and is unable to maintain a normal body temperature. Opisthotonos with stiffening of the extremities and labored respirations may occur, and, finally, death may ensue. Potter¹ reports that, at necropsy, there are no characteristic microscopic findings of the involved tissues. Until recently, approximately 75 per cent of all infants with sclerema neonatorum died. Therapeutic advancement, however, has greatly altered this prognosis, and it is of prime importance to recognize the disease early and start therapy immediately.

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Sclerema neonatorum was first described in 1722 by Usenbenzius² and later, in 1784, by Underwood.³ The latter gave such a vivid description of the hardened tissues, the debilitated state, and the rapidly fatal course that the condition was called Underwood's disease for many years. In 1948, Hughes and Hammond⁴ reviewed the findings of 28 cases in the literature and reported the following: (1) the average age of onset of sclerema neonatorum was 4 days with extremes from birth to 70 days; (2) 25 per cent of the mothers were ill at the time of delivery; (3) all deliveries were spontaneous except 2; (4) the average birth weight was 2,800 gm. with variations from 2,150 to 4,100 gm.; (5) the majority of infants exhibited abnormal behavior at birth, weakness and cyanosis being the most common; (6) body temperature was difficult to control in almost all infants, and other complications besides sclerema were evidenced; and (7) 75 per cent of the infants died, and the average age at the time of death was 10 days.

The etiology of sclerema neonatorum is unknown; however, it has been suggested that the inability of these infants to maintain a normal body temperature may result in the solidification of subcutaneous fat. The fats of the body are composed primarily of glycerol combined with oleic, palmitic, and stearic fatty acids. While palmitic and stearic acids are solids at body temperature, oleic acid does not solidify until 22 to 25° C. Therefore, the greater the oleic acid content of the tissue the lower the solidification point. Langer⁵ has shown that the oleic acid content of the fat of newborn infants is significantly less than in adults. The inability of these infants to maintain a normal body temperature may result in chilling and solidification of the fat of newborn infants. Hughes and Hammond⁴ have postulated that these patients are debilitated and suffer severe shock. The accompanying decreased peripheral circulation results in diminished temperature, impaired cellular metabolism, and resultant hardening of the body fat.

TREATMENT

Until recently, the treatment of sclerema neonatorum consisted of an attempt to maintain body temperature and keep the patient in fluid

and electrolyte balance. In 1951, Kendig and Toone⁶ reported the first effective treatment. Because of the known effect of the steroids on fat and connective tissue, they administered cortisone to an infant with sclerema neonatorum, and this patient survived. Since then, other reports of the successful usage of steroids and ACTH have appeared in the literature.⁷⁻¹⁴ The amount of ACTH administered has varied from 10 to 20 mg. per day in divided doses. When cortisone has been used, 20 to 30 mg. per day has been administered parenterally in divided doses every six to eight hours. In severely debilitated infants, cortisone is the drug of choice, as these patients may have a limited ability to respond to ACTH due to adrenal exhaustion. Prophylactic antibiotics should also be given.

Within a ten-month period, we encountered the following 3 cases of sclerema neonatorum at the St. Louis Park Medical Center.

CASE REPORTS

Case 1. B. B. W. was born after 32 weeks of gestation and weighed 4 lb., 5 oz. The mother was a 23-year-old gravida III, para II white woman. Labor began spontaneously, lasted five and one-half hours, and was uncomplicated. At the time of birth, the cord encircled the neck, and the infant was moderately cyanotic. There were no other apparent injuries or abnormalities. The infant was placed briefly in an air lock and then transferred to an isolette for routine premature care. On the second day of life, the infant became lethargic and cyanotic. Physical examination revealed edema of the hands and face with scattered petechiae and ecchymosis over the extremities. On the morning of the third day, the nursing staff observed an abnormal firmness of the body tissues. The physician was immediately notified, and physical examination established the diagnosis of sclerema neonatorum. The patient was started on 10 mg. of cortisone intramuscularly every twelve hours. The following day, there was noticeable improvement in the patient's condition. Four days after therapy was initiated, all evidence of sclerema neonatorum had disappeared. The dosage of cortisone was tapered gradually and stopped after six days. The patient was discharged after thirty-one days, and weighed 5 lb., 11½ oz. Physical examination was entirely normal at that time.

Case 2. B. B. T. was born after 31 weeks of gestation. The mother was a 27-year-old gravida III, para II, Rh positive white woman. The membranes had ruptured after six months of gestation, and, one week prior to delivery, the mother had had an elevated temperature accompanied by a vaginal discharge. Delivery was spontaneous after twenty-six hours of uncomplicated labor. The infant weighed 3 lb., 3 oz. at birth and was slightly cyanotic. There were no apparent abnormalities or injuries. Two days after delivery, hyperkinetic behavior and a distended abdomen were noted by the nursing staff. A repeat physical examination was normal. The following day, athetoid movements were observed, and the extremities were slightly rigid. Later that day, activity decreased markedly, respirations became labored, and, for the first time, it was noted that the body tissues were hardened. The indurated areas involved the tissues over the greater trochanters, the shoulder prominences,

and the cheeks. Three milligrams of ACTH were immediately injected intramuscularly. Despite prompt therapy, the patient's course was rapidly downhill, and he expired six hours after treatment was initiated.

Case 3. C. A. was the product of a normal full-term pregnancy. The mother was a 24-year-old gravida II, para 0, Rh positive white woman. Labor lasted forty-one hours, and the membranes ruptured thirty-eight hours prior to delivery. Pitocin was administered intravenously on 3 occasions without effect. A cesarean section was then performed because of a soft tissue dystocia type of labor and a questionable constriction of the lower uterine segment. At birth, the infant weighed 7 lb., 13½ oz. In the delivery room, he had a weak cry and shallow respirations, and slight retractions were noted. Prophylactic antibiotics were begun. On the second day, the nursing staff observed that the abdomen was distended and the buttocks were hardened. Physical examination revealed an irritable patient with a weak cry and shallow respirations. The skin was slightly cyanotic with indurated areas over the buttocks and shoulders. These areas did not pit on pressure and could not be moved over the underlying tissues. Sclerema neonatorum was diagnosed, and the patient was immediately started on 6 mg. of cortisone intramuscularly at six-hour intervals. Within twenty-four hours, improvement was noted. After two and one-half days, the cortisone dosage was decreased and gradually stopped over the following week. He was discharged on the fifteenth day of life after a normal physical examination.

SUMMARY

Sclerema neonatorum is an acute condition occurring only in newborns. The etiology is unknown, and, until recently, the condition was almost uniformly fatal. The use of cortisone and ACTH has greatly altered this prognosis. The necessity of early recognition and prompt initiation of therapy has been stressed, and 3 cases have been presented.

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Separation Anxiety—School Phobia

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SCHOOL PHOBIA is a clearly defined emotional disturbance occurring most frequently in children 6 to 10 years of age. It is characterized by intense anxiety, which is first related to leaving for school in the mornings. This fear may have appeared initially as a strong reluctance to leave mother to go to nursery school or kindergarten, but the anxiety commonly reappears with increasing intensity at the beginning of each new school year and after vacations. Then, in the second or third grade, often after the child has been at home ill for a few weeks or has experienced an emotional upset, he is overwhelmed with anxiety when expected to return to school. This feeling may be accompanied by nightmares, nausea, abdominal pains, and a fear of fainting. The particular physical complaint is often a reflection of a similar symptom in one of the parents whose health the child has also been worrying about.

School phobia is actually a separation anxiety reaction, usually related specifically to leaving home and mother. The reaction is precipitated in this age group by the requirement of regular school attendance. Because of the relationship to school, the misnomer "school phobia" has been applied to this disturbance. Actually, it is not a phobia or neurotic fear of going to school but rather the intense fear of leaving the security of maternal protection that precipitates the symptoms. Once the child arrives at school and his parent has effectively left him for the day, the youngster is often relaxed and able to enjoy school participation. However, anxiety reappears again the next time the need arises to leave home for school.

When the child stays home, he complains of missing his classmates and his teacher, and he is usually very desirous of keeping up with his school work.

Because of their emotional involvement and a reluctance to face their own role in producing these reactions, the parents of these children fre-

quently project the blame for their children's anxiety onto the school. Changing teachers, classes, or even trying a different school is often attempted. Such changes may temporarily relieve the anxiety, but the symptoms quickly reappear. When the parents, or the physician at their suggestion, manipulate a change of teachers or schools, the implication is that the school is at fault and this may antagonize school personnel who feel unjustifiably criticized. Thus, a hostile setting is created to which the child will ultimately find it even more difficult to return.

School phobia is a common problem. There are perhaps one or two children with some degree of this disturbance in every elementary school. Some of these children have mild feelings of anxiety which they are gradually able to repress sufficiently to conform to school attendance expectations. Many become intensely anxious, and, as their anxiety causes other symptoms, their parents seek medical help.

The observations reported in this paper are taken from 21 cases, 10 of which were seen in the previous year. Five of these 21 patients were adolescents when they were referred for treatment. Their problem had by then become chronic and was much more deeply involved and complicated by additional neurotic defenses. This picture of chronic, severe school phobia in older children has been referred to as characterologic rather than neurotic,¹ but, more likely, it simply represents the result of several years' development of the emotional disturbance.

In the remaining 16 preadolescent children of this series, the development of the school anxiety problem may be more clearly seen. These 16 children ranged from 6 to 11 years of age, and 5 were 8 years old when referred. There were 9 boys and 7 girls. Ten of these 16 were the only child or the youngest in the family.

Usually, these children are intellectually bright and are described as having been previously very "good," well behaved, affectionate, and responsive. Also, they appear to be basically timid, shy, and rather dependent, passive youngsters who frequently have a history of excessive fears earlier in life. This background is pertinent to the mother's role in the school anxiety problem,

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as these are children who have become emotionally very close to her.

The fathers of this group of children are best described as passive, withdrawn, inadequate men, or they are so uncomfortable with family responsibilities that they manage to be away from home much of the time. Consequently, the mothers do not find the satisfaction they need in the relationship with their husbands and so have unconsciously turned to their passive child for a close, mutually dependent relationship. Such mothers have been previously described as basically having strong unmet dependency needs.² As the child starts his school experience and begins to obviously mature, the mother becomes fearful of losing this close emotional tie. This fear is quickly communicated to the sensitive child, who responds with anxiety.

The child's reluctance to leave his mother daily to go off to school may appear as early as nursery school or kindergarten. The reluctance, accompanied by increasing anxiety, tends to reappear at the onset of each school year and after vacations or absence for illnesses. A health, economic, or marital problem in the family may increase the mother's frustration and anxiety, which the child responds to with a school phobic reaction. The child may begin with psychosomatic symptoms, particularly gastrointestinal complaints. At this point, the physician's help is sought. After the physical complaints are found to be without organic cause and the parents become insistent that the child return to school, more clearly-observable phobic behavior is seen. This often extends to nightmares, fears of fainting or dying, or fears of the mother dying or leaving home while the child is away. Parents may then try pleading, bribing, coaxing, and, finally, threatening in their attempts to make the child go to school but all to no avail. When they lose their temper with the child, he feels less secure and his anxiety increases even more. This anxiety is intense, and it is not controlled by tranquilizers. Attempts to force the child back to school or away from his parents may produce panic and should be strictly avoided. How intensely anxious these children may become is demonstrated by a 9-year-old boy who, when hospitalized for observation, ran from a locked ward to a sixth floor ledge on the hospital roof and threatened to jump. He would not leave the ledge until a member of his family appeared.

As the child's fear of separation continues, other situations are involved, such as going to Sunday School, parents going out in the evening, and mother going shopping. Eventually, the child demands the mother's constant presence,

even insisting that his mother sleep with him.

It is imperative that the child return to school just as soon as he can tolerate the separation. The mother often needs help to free the child from her anxiety and from his overdependence on her. There are many ways, both obvious and subtle, in which the mother communicates her anxiety to the child and prevents him from comfortably leaving her. She frequently accompanies her child to school when the anxiety is just beginning and goes into the classroom and waits expectantly for the child to become upset. Such a mother resents and resists efforts of the visiting teacher or school nurse to separate the child from her and to take him alone and more calmly into his classroom.

In the physician's office, these mothers are overly solicitous with their children. They hover over the child, go to extremes to reassure him that he "need not be afraid" to go alone into the doctor's office, that "mother won't leave" until the child returns, and "that he won't be hurt." All these statements are ostensibly reassuring but actually very anxiety provoking to the child. Often, these mothers acknowledge that they are not really very insistent in their efforts to persuade their children to go to school, although they maintain that their intentions are the best. They may defend the child's absence when the father tries to be firm about school attendance.

Many mild school phobia reactions are handled by the teacher or school social worker who recognizes the problem early and, enlisting the mother's cooperation, is able to take over management of the child's school attendance. These mothers realize intellectually what is occurring and allow their children to leave, concealing their own anxieties sufficiently to permit the separation to take place. Sometimes a strong father can help by taking over the job of seeing that the child goes to school.

On the other hand, some of these children, without adequate treatment, progress to severely neurotic adolescents who live very uncomfortably in a hostile, dependent relationship with the parent they cannot grow away from emotionally. Adequate treatment involving the parents is important also to prevent the problem from recurring later in another child in the family. Five of the families in this group reported that they had previously had similar problems with older siblings.

TREATMENT

Treatment of the school phobia reaction is directed first toward helping the mother become aware of her conscious or unconscious reluctance

to let her child grow up and leave her. In this instance, this dread of separation is symbolized by the child going to school. Concurrently, the child is helped to bring his fears about leaving home and mother to the interview. He is supported by his therapist in returning to school, and any resulting anxiety is handled in the interview situation.

One 9-year-old boy, whose divorced mother had repeatedly threatened to "pack her suitcase and leave" him as a means of controlling him, regularly left for school but hid within view of his home and watched to see that mother didn't carry out her threat and desert him. He subsequently related a dream of frantically chasing and unsuccessfully seeking his mother through a myriad of closed doors. This dream symbolized his basic fear.

Tranquilizers have been of moderate value, and the child is allowed to carry and take the medication as needed. Invariably, the child keeps his pills with him for material reassurance (his doctor's magic potion), but rarely does he use them.

When the father is available and capable of responding to treatment, he is helped to become

more of a support to his wife and more adequate in his paternal role. This then provides the mother with more emotional satisfaction, enabling her to free the child.

Severe school phobia in which, despite all efforts, the child seems unable to return to school may be indicative of serious psychopathology in the family. Both parents may have dependency needs which have not been met and deep feelings of inadequacy, which are intensified by their inability to make their child go to school. This failure increases the parents' anxiety and, thus, also the child's. Intensive treatment may be necessary in such instances. There is some suggestion that the longer the situation exists, the more treatment is required. In the group reported here, the 6- to 8-year-old children resolved their anxiety after an average of 5 interview sessions. The 9- to 11-year olds required an average of 15 interviews, while treatment with the adolescents continued for several months.

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PATIENTS IN WHOM temperature rises with no apparent cause immediately after admission to a hospital may be emotionally disturbed.

Charts of alternate first admissions to a university hospital were examined. Patients with possible organic or drug factors that might modify temperature were excluded. Almost 4 per cent of all first admissions had fever without apparent cause. Of all patients without discernible reason for fever, about 27 per cent had temperature elevation. This phenomenon was observed much more frequently in men 21 to 40 years of age than in other population groups. The incidence of obscure fever was 4 times greater among first admissions to the psychiatric service than on other services.

KERR L. WHITE, M.D., and WALTER N. LONG, JR., M.D., University of North Carolina, Chapel Hill. *J. Chron. Dis.* 8:567, 1958.

Importance of Suspecting and Treating Congenital Hip Disease in Early Infancy

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CONGENITAL HIP DISEASE is used in this discussion to denote the abnormal formation of the hip joint in early life presumably due to prenatal, early postnatal, or hereditary influences. The terms dysplasia, preluxation, subluxation, and dislocation are all included in this general designation.

While the etiology and pathogenesis of congenital hip disease are both unknown, or at least controversial, *early diagnosis* of this condition is almost universally accepted as the key to good therapeutic results. The plea for early diagnosis comes primarily from orthopedists who must deal with neglected or inadequately treated children with congenital hip disease.

The challenge for early recognition, then, is clearly directed to those who care for infants—pediatricians and general practitioners. To meet this challenge, we must first be aware of the importance of early diagnosis and institution of therapy and then know the answers to a number of vital questions:

What are the early clinical signs that make the physician suspect the presence of congenital hip disease?

How early can diagnosis be suspected?

What is the role of the radiologist, and how much help can the clinician expect from his techniques?

Once the diagnosis is suspected, what are the consequences of delay in treatment?

What are the indications for orthopedic referral?

One of the purposes of this study was an attempt to answer these questions.

The study is an analysis of the experience with congenital hip disease of a group in general pediatric practice over a period of seven years. Fifty-one infants aged 4 months or under suspected of having congenital hip disease are included. Each infant was examined by a pediatrician in the group in the course of routine examinations of well babies. All infants who were first seen *after* 4 months of age were excluded from this study.

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Infants are examined in the hospital nursery at birth and prior to being discharged. As part of the routine office examinations during the first six months, the infants are inspected for symmetry of inguinal creases, leg movements, and equality of leg length. An attempt to gently and simultaneously abduct the flexed thighs constitutes an important part of the examination. Limited or unequal abduction proved to be the most important observation in suspecting hip pathology.

Records of the 51 infants were reviewed, and the following findings were noted:

1. Ninety-two per cent of the infants showed *abnormal abduction* of the flexed hips as the major presenting sign leading to suspicion of hip disease. This abnormality was *unequal* abduction in 89 per cent (table 1).

2. Seventy-eight per cent of the infants were between the ages of 1 and 4 months when disease was first suspected. None were over 5 months. There was no correlation between eventual severity of the disease, as measured by length or type of treatment required, and the age at which disease was suspected.

3. There was a ratio of over 7 girls to each boy affected. This ratio is similar to other reported series.

4. The left hip was suspected 3 times as often as the right. No cases were considered bilateral in the final diagnosis.

ROENTGENOGRAPHIC REVIEW

Since the validity of x-ray diagnosis of congenital hip disease in early life is controversial,¹ an attempt was made to evaluate the usefulness of x-ray examinations of patients in this series.

All anterior-posterior views of the hips were reviewed by the author independently, without prior knowledge of the radiologist's impression or the clinical history. This review consisted of observing 3 generally accepted presumptive features of congenital hip disease: namely, comparing the acetabular angles, the continuity of Shenton's line, and the developmental progress of the femoral capital epiphysis (figure 1).

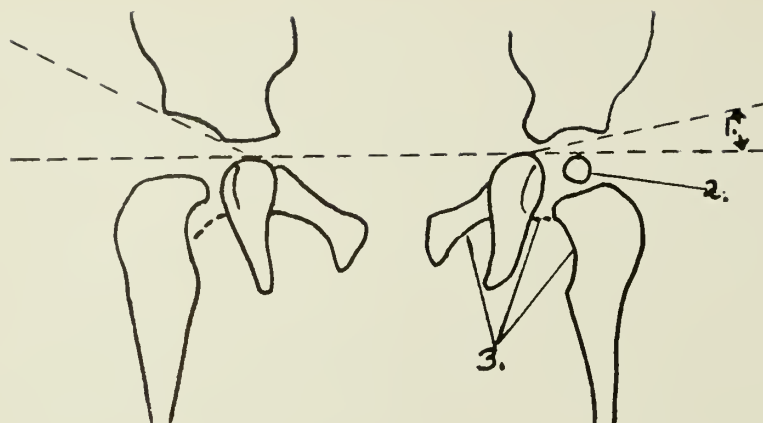


Fig. 1. Diagrammatic representation of common radiographic changes in congenital hip disease. Note normal left hip, abnormal right hip. (1) acetabular angle, increased in right hip; (2) femoral capital epiphysis, absent in right hip; and (3) Shenton's line, broken in right hip.

TABLE 1
MAJOR PRESENTING SIGN LEADING TO SUSPICION OF
CONGENITAL HIP DISEASE—51 CASES

Sign	Cases
Unequal abduction of flexed hips	43
Bilateral restricted abduction	4
Audible click on abduction of hips (newborn)	2*
Unequal leg length	1
Contralateral eversion of foot	1
Total	51

*Audible click on abduction is not an uncommon finding in newborn examinations. It should be differentiated from the "sign of the jerk" (Ortolini), which is audible, palpable, and visible reduction of dislocation and is pathognomonic.

The results of comparing the radiologist's impressions with the author's were of interest for 2 reasons:

1. There was disagreement as to the presence of pathology in 1 out of 3 cases, with the author tending to find pathology more often by using his predetermined criteria.

2. In reading the radiologist's report, it was difficult at times to decide whether his impression should be interpreted as suspicious or normal.

The latter point is important, since clinicians often are not in a position to review personally roentgenograms made of their patients.

One may conclude, therefore, that roentgenographic aid in the diagnosis of *early* congenital hip disease (before the age of 4 months) may be quite inconsistent. It must be emphasized, however, that x-ray examination is invaluable for follow-up.

MANAGEMENT

Our mainstay of treatment has been the abduction pillow, often called the Frejka splint. The principle of this therapy is to maintain the grow-

ing femoral head in proper position in the forming acetabulum, while still allowing active movements of the infant. Several devices are available; however, we have found the pillow satisfactory. It maintains the flexed legs in maximal abduction and is inexpensive and quite easy to maintain. Some enterprising parents have made pillows for their own infants and have thus taken a more active part in the treatment program.

A complete description of the abduction pillow and discussion of its proper use is available in the publications of the late Dr. Vernon Hart.^{2,3}

Thirty-eight babies, or 73 per cent of this series, were treated with the abduction pillow alone. Of these, 26, or 72 per cent, wore the pillow continually for six months or less. The decision to discontinue full-time abduction was based on radiologic improvement (usually with orthopedic consultation), since clinical improvement was complete within several weeks in most cases.

Nine patients, or 18 per cent, of the series received no treatment despite the fact that 6 of them had initial roentgenograms which were read as suspicious or positive. Follow-up of these 9 patients showed no clinical hip disease at ages of 9 months to 7 years. One would feel more comfortable, however, if these normal clinical findings were confirmed in each case by roentgenogram.

These 9 cases demonstrate, if they are, in fact, normal, that our diagnostic criteria for congenital hip disease are still rather crude and that there is the possibility of spontaneous regression.

SEVERE CASES

Hip disease was classified as severe on the basis of duration and type of treatment.

Thirteen babies who wore the pillow continually for more than six months or required im-

mobilization in a plaster spica were thus classified.

A study of these 13 cases brought to light a number of interesting findings:

Delay in the initiation of treatment seemed to be an important factor relating to the severity of disease.

In 8 of the 13 cases, treatment was delayed one to three months. Initial suggestive clinical signs in these infants were definite in 3, questionable in 4, and atypical in 1, that is, this baby was noted to evert the contralateral foot. Thus, the clinical signs can be inconclusive even in cases which later prove severe as defined here.

Four of these babies in whom treatment was delayed required plaster immobilization, and, of the other 4 treated by pillow abduction alone, 2 still showed hip pathology at 18 and 21 months of age, respectively.

In contrast, the remaining 5 patients with "severe" disease who were placed in abduction pillows *within a few days after hip disease was suspected* each had normal hips confirmed by roentgenogram by 15 months of age.

As mentioned earlier, there was no correlation between the severity of disease and the age the diagnosis was suspected. However, there did seem to be a relation between delaying treatment and the severity of disease.

CONCLUSION

Fifty-one cases of suspected congenital hip disease have been analyzed. All were suspected during the course of routine office examinations of well infants in a general pediatric practice. All cases were suspected by 5 months of age.

The following general principles may be list-

ed to meet the challenge of congenital hip disease:

1. The burden of early suspicion and management of congenital hip disease rests with the pediatrician and general practitioner.

2. Early diagnosis is based on clinical awareness of the problem and physical examinations of the infant before 5 months of age.

3. Roentgenographic diagnosis before 4 to 6 months of age is less helpful than the clinical diagnosis and may be misleading if relied on entirely.

4. Treatment with a suitable abduction pillow should be started without delay as soon as congenital hip disease is suspected, since it seems impossible to predict which cases will be mild and which severe.

5. The width of the pillow should abduct the hips maximally, and the patients should be checked for change in clinical signs and fit of the pillow at least every month or two.

6. Orthopedic consultation is indicated: (a) whenever frank dislocation is diagnosed or seriously considered, clinically or radiologically, (b) whenever significant improvement does not occur in clinical signs by 6 months of age or radiographically by 7 to 8 months of age, (c) in any case which is discovered in an infant over 6 months of age, and (d) when clinical and radiographic cure is not present by 1 year of age.

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ACUTE ATAXIA IN CHILDREN, characterized by sudden onset of staggering gait, is apparently symptomatic of cerebellar infection or encephalitis. In 15 children, ataxia occurred with mumps, poliomyelitis, influenza, varicella, or insecticide intoxication. This benign, transient syndrome should be differentiated from ataxia caused by a cerebellar tumor.

GENE M. LASATER, M.D., and J. T. JABBOUR, M.D., City of Memphis Hospitals and the University of Tennessee. *J. Dis. Child.* 97:61, 1959.

Hyperchloremia and Hypernatremia in a 20-Month-Old Female

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DURING THE RECENT DECADE, more and more emphasis has been placed on electrolytes in the body fluids. Disturbances causing water and electrolyte loss, such as diarrhea and vomiting, have been shown to change the general normal relationship of salts in the body. Poor kidney function and inadequate ingestion or absorption of food and water add to the gravity of the situation.

Proper replacement of the necessary salts and water by continuous intravenous administration combined with treatment of infection makes the therapy in a given case rather complicated. The following case, which is given in some detail, illustrates the many problems.

CASE REPORT

A 20-month-old female, who was born July 25, 1956, was admitted to St. Barnabas Hospital in Minneapolis on April 20, 1958, from an outlying smaller hospital. She had previously been very well.

The child had been well until the evening of April 18, 1958, when vomiting occurred. The vomiting continued at intervals and occurred 8 times during the night. Early the next morning, watery stools without mucus or blood were observed. The following morning, April 20, 1958, the child was admitted to a nearby hospital.

Lytren was given orally and was well taken. Also given was subcutaneous normal saline. In the afternoon, less than two days after the illness began, the temperature rose rapidly and by 5 P.M. was 107° F. The child became comatose, and the muscles of her body began to twitch.

The family physician administered 600,000 units of penicillin and alerted all of us at St. Barnabas Hospital and brought in the child posthaste.

On admission, the child was critically ill. She was comatose, limp, and twitching, and her temperature was then 104° F. Her eyes were sunken, and she had a dry, glistening tongue. This unique condition of the tongue, which was as if a fine, dry silvery powder had been brushed on the surface, may be indicative of the condition to be described.

Because rales were heard in the right anterior lower chest, 250 mg. of Chloromycetin was given intramuscularly. A cutdown in the ankle was done for hydrating fluids. Oxygen was administered by funnel during these procedures. Although urination was noted on the trip

to St. Barnabas Hospital, no stools had been observed since early morning. As will be mentioned, anuria and oliguria continued in spite of intravenous liquids for the next twenty-four hours.

The shocklike picture, pallor, and irregular pulse continued in spite of the above therapy, so 50 cc. of plasma and 75 mg. of Solu-Cortef were given by cutdown after 80 cc. of hydrating solution had been administered. Only then did the child show general improvement.

Electrolytes of blood were studied during the critical period. After the initial blood count, all tabulated results were done by the microchemical method. Those results are shown in Table 1.

The therapy was polyionic No. 1 for the next twenty-four hours until 9 P.M. on April 23, 1958, when the intravenous fluids were discontinued. The interpretation was that the polyionic with less milliequivalents would keep the CO₂ combining power at a normal level and decrease the sodium and chlorides. Unfortunately, no recheck was done, although every clinical observation indicated that the child was normal by April 28, 1958.

DISCUSSION

Definite improvement was evident from the morning of April 21, 1958. The child was alert; the blood pressure was 90/60; and the temperature, pulse, and respiration were lower. The temperature had dropped from 106° to 101° F. The respirations dropped from 56 to 44 and the pulse from 160 to 140. A few rales were still present, but none were heard later. Twitchings of the muscles and legs were still noticed. Fluids and food were taken willingly after the second day, although they were given cautiously until after the cutdown was removed at seventy-three hours. In hydrating solutions, 2 mg. of vitamin C were added to each cubic centimeter. Later, 500 mg. of high vitamin C was given orally four times a day. Also given was a vitamin concentrate, Vi-Daylin.

Initially, 250 mg. of Chloromycetin was given intramuscularly and 250 mg. intravenously. This antibiotic was continued (125 mg. intramuscularly four times a day) for three days. Then 125 mg. of the drug was given orally twice a day until the date of discharge.

The urine in the first thirteen hours amounted to 27 cc. and contained albumin, 2+ and glucose, 1+. It had a specific gravity of 1.020

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TABLE 1

Date	Time	Hours	Previous therapy	Blood—mEq./L.*			CO ₂ combining power	Comments
				Sodium	Potassium	Chlorides		
1 20/58	7 P.M.		None	182	4.9	131	13.2	Comatose
1 21 58	8 A.M.	13	5% glucose in distilled water	155	4.0	124	9.6	Alert and twitching
1 21 58	3 P.M.	7	Traverts No. 2 plus 5% glucose	150	3.7	121	10.6	Oral milk
1 22/58	8 A.M.	17	As above	150	4.0	132	14.1	Milk and some solids
1 22 58	8 P.M.	12	5% glucose in distilled water	Not done	Not done	121	15.9	Same

*Normals for mEq./L.: sodium, 135 to 150; potassium, 3.5 to 5.5; chlorides, 100 to 106; CO₂, 16 to 27.

with a few red and white blood cells and was negative to acetone and diacetic acid. The chlorides were 0.3 gm. per cent. Excretion improved to $\frac{3}{4}$ oz. per hour after seventeen hours when the indwelling catheter was removed. Spontaneous urination was satisfactory thereafter.

The stools became loose again during the first night, on intravenous fluids only. The first stool, estimated to contain 6 oz. of liquid, had a few green flecks. Five other similar stools of much less volume were passed that night.

During the recovery phase after the intravenous therapy, occasional emesis and mushy stools occurred. With some restriction of diet, normal stools and a good intake without emesis was obtained by April 28, 1958.

The child was discharged to the care of the family physician who reports normalcy in all regards. It was recommended that the child return and have further electrolyte studies, but this was not done.

CONCLUSIONS

A 20-month-old female with severe vomiting followed by diarrhea for thirty-six hours was

then given Lytren and subcutaneous normal saline. Hyperpyrexia developed then. Pulmonary findings indicated a pneumonitis, perhaps aborted by intensive antibiotic treatment with Chloromycetin.

Intravenous therapy of hydrating solution, plasma, and Solu-Cortef may have been life-saving. Early improvement, therefore, seems related to the establishment of kidney function and was at least coincidental with recurrence of loose stools.

The blood chemistry showed abnormal sodium and chlorides affected initially most by venoclysis of 5 per cent glucose in distilled water with high vitamin C. Higher milliequivalent solutions of sodium and potassium resulted in higher CO₂ combining power but tended to hold the sodium and chlorides at a high level. Thus, polyionic No. 1 with lower sodium and potassium seemed preferable.

Of clinical value in suspecting the diagnosis of hypernatremia with hyperchloremia may be the absence of acetone and diacetic acids in the urine in addition to the silvery coating of the dry tongue.

SOME OF THE FACTORS that will lead the obstetrician to suspect excessive fetal development are maternal weight gain in excess of 24 lb., tall maternal stature, previous large infants, maternal diabetes, toxemia of pregnancy, and pregnancy prolonged beyond two hundred and ninety-three days. Poor progress of labor in a patient who previously has had easy deliveries also suggests a large infant.

Large infants are more apt to be injured at birth than are small babies. Abdominal delivery is preferable when disproportion prevails. Postpartum hemorrhage is the principal maternal hazard.

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Dermatomyositis in Childhood

Report of Studies on 7 Cases and a Review of Literature

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THE GREATEST PROBLEM in the diagnosis of any condition is to remain aware of the possibility of its occurrence.

Dermatomyositis is a generalized disease involving striated muscle with nonsuppurative inflammation and is usually associated with cutaneous manifestations. Osler once said, "Dermatomyositis is after all a deep seated scleroderma."

HISTORICAL REVIEW AND INCIDENCE

Most authors credit Wagner¹ with the first clinical description of dermatomyositis in 1887. This was a case report of a 34-year-old woman with weakness of the upper extremities, pain, and rather rapid progression to death. In 1890, Unverricht² proposed the term "dermatomyositis."

In 1939, Schuermann³ reviewed 263 cases of which 47 were in children under the age of 15 years. Then, in 1950, Selander⁴ reported 22 cases in children less than 7 years of age. Talbott and Ferrandis⁵ state that in their experience dermatomyositis ranks second to systemic lupus erythematosus among the so-called unusual "collagen" diseases. Christianson and associates,⁶ of the Mayo Clinic, reviewed 270 cases collected from 1916 to 1954. Ages ranged from 2½ to 73 years, with 179 females and 91 males. The sex ratio was about 2:1. Of these 270 patients, 55 were of the pediatric age. In 1953, Wedgwood and associates⁷ reviewed the experience at Boston Children's Medical Center and Massachusetts General Hospital between 1916 and 1952. Twenty-six cases were reported in children between 2 and 11 years of age. Eleven were male, and 15 were female. One child was a Negro. Two children were mirror-image twins. In the twins, the disease began one year apart. In 1957, Everett and Curtis,⁸ of the University of Michigan, reported 19 cases of dermatomyositis seen among children at the University of Michigan

Hospital between 1935 and 1955. Age at onset was 4 months to 17 years. One was a Negro. Seven were male, and 12 were female. Sheard⁹ reviewed 25 cases between 1927 and 1951 seen at Columbia-Presbyterian Medical Center, New York City. Four were less than 10 years of age. Three were from 11 to 20 years of age.

CLINICAL FINDINGS

The most common early symptoms seem to be weakness, fatigue, and facial erythema.

Sheard summarized the presenting symptoms in his cases as follows:

	Number	Per Cent
Swollen eyelids or rash on face	8	32
Muscular fatigue or weakness	5	20
Aching, stiff muscles	5	20
Rash on hands and then on face	3	12
Sore, swollen hands	2	8
Sensitive skin	1	4
Exfoliative dermatitis	1	4
Total cases	25	

Everett and Curtis' cases presented as follows:

	Number	Per Cent
Facial erythema	6	31.6
Fatigue	4	21.0
Weakness (specific)	3	15.7
Muscle tenderness	2	10.5
Erythema elsewhere	1	5.3
Sunburn	1	5.3
Drug eruption	1	5.3
Raynaud's phenomenon	1	5.3
Total cases	19	

The cutaneous manifestations of dermatomyositis are exceedingly variable. The characteristic lesion is the violaceous or heliotrope discoloration of the eyelids and periorbital tissues. Keil¹⁰ described the manifestations in the skin and mucous membranes in dermatomyositis with special reference to the differential diagnosis from systemic lupus erythematosus. Eyelids occasionally reveal fine, closely set telangiectases. Small joint skin lesions are characterized early by edematous, blotchy, red, telangiectatic patches over the metacarpophalangeal joints. Late in the course of the disease, the skin is often thin, wrinkled, shiny, and slightly scaled, often col-

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ored bluish-red with a superimposed livid hue. The extremities frequently have a brawny texture—somewhat leathery and dry.

Muscle weakness is a cardinal feature of dermatomyositis. Victor¹¹ summarized the essential features of this weakness as involving proximal muscles more than distal in a symmetrical distribution. Reflexes seem to be well maintained despite profound muscle weakness. Atrophy is not prominent early but is expected late in the disease. Sensory changes are not expected, though Raynaud's phenomenon is reported in most series. Cold pressor response curves, similar to Raynaud's, were described in 5 of 9 adults reported by Jager and Grossman.¹²

Fever is frequently associated with acute dermatomyositis. This is usually low-grade and only an incidental finding.

Calcinosis is an interesting manifestation of dermatomyositis. Christianson and associates⁶ reported calcinosis in 29.1 per cent of 55 children and 5.5 per cent of the adult group. Wedgwood and co-workers⁷ found 7 of 26 patients with calcinosis, or 27 per cent. Everett and Curtis⁸ reported 8 cases among 19 patients, or 42.4 per cent. Sheard⁹ found 4 cases of calcinosis in 25 cases of dermatomyositis, or 16 per cent. His cases included children and adults. Wheeler and associates¹³ reviewed 66 cases of calcinosis circumscripta or universalis between 1938 and 1952. The diseases associated with the calcinosis were as follows:

	Number
Dermatomyositis	24
Scleroderma	24
Raynaud's syndrome	2
Acrodermatitis chronica	1
Rheumatoid arthritis	2
Gout	1
Lupus erythematosus	1
Post chickenpox	1
No evident primary disease	10

Figure 1 represents a summary of clinical findings in cases of dermatomyositis as reported by Wedgwood and associates⁷ and Everett and Curtis.⁸

Though not mentioned in the pediatric literature, the coexistence of malignancy and dermatomyositis is reported in adults. Many isolated case reports are available, but perhaps the only large series is again that of Christianson and associates,⁶ of the Mayo Clinic. Of 270 cases, 18 had associated malignancy, or 6.7 per cent of the group. These patients were from 40 to 72 years of age. This incidence was thought to be about 5 times greater than that expected for this group.

Another interesting report was that of Cush-



Fig. 1. Clinical findings in dermatomyositis.

ing's syndrome which developed six years following untreated dermatomyositis in 2 girls aged 9 and 22 years. Both demonstrated increased 17-ketosteroids and corticosteroids in the urine as well as hypertension, virilism, typical facies, and hyperplastic adrenals on biopsy.

LABORATORY FINDINGS

The peripheral blood counts and routine urine analyses show no abnormality in dermatomyositis. The erythrocyte sedimentation rate is usually elevated, though not often to the same degree as observed in systemic lupus erythematosus. The L.E. clot test seems to be consistently negative. Madden¹⁴ reported the absence of L.E. cells after 21 sternal marrows on 5 patients with dermatomyositis. These marrows were evaluated by Dr. Sundberg at the University of Minnesota Hospitals.

There seems to be no good indication of streptococcal infection in this group of patients. Anti-streptolysin-O titers have been within normal limits. C-reactive protein has been 0. Serum proteins have not been reported by electrophoresis, but the globulins tend to be elevated where reports have been included.

Creatinuria occurs in dermatomyositis; however, one must evaluate this with the knowledge that most women, children, castrated persons, and older men may excrete up to 400 mg. of creatine in the urine every twenty-four hours. An increase in creatine excretion is often associated with a decrease in creatinine excretion. The creatinine coefficient (mg. creatinine excreted per twenty-four hours per kilogram of body weight) is reported as 18 to 32 normally and is decreased in dermatomyositis. Creatinuria is probably due to a failure of the muscle to utilize

creatine and certainly not in any way specific for dermatomyositis. Reports by Jager and Grossman,¹² Domzalski and Morgan,¹⁵ and Oppel and associates¹⁶ include observations on creatinuria.

Creatinuria may occur in the following (Domzalski and Morgan¹⁵):

- I. Myopathies
 - Muscular dystrophy
 - Secondary to amyotrophic lateral sclerosis
 - Myotonia atrophica
 - Amyotonia congenita
 - Dermatomyositis
- II. Endocrinopathies
 - Diabetes mellitus
 - Thyrotoxicosis
 - Acromegaly
 - Cushing's syndrome
 - Addison's disease
- III. Infection
 - Polio myelitis
 - Guillain and Barré syndrome
- IV. Starvation
- V. Drugs
 - Thyroid
 - ACTH and cortisone
 - Epinephrine

Serum electrolytes, including calcium and phosphorus, in patients with calcinosis have been within normal limits. Electromyography is abnormal but again nonspecific. As reported by Roberts and Brunsting,¹⁷ "on voluntary movement, there is a decrease in size, amplitude and duration of the motor unit action potential while the number of action potentials relative to the strength of contraction shows an increase." In resting muscle, there is frequent evidence of fibrillation potentials and increased irritability of the muscle to the movement of the needle.

PATHOLOGY OF MUSCLE AND SKIN

Sheard⁹ described the muscle as showing the following: (1) increase in muscle nuclei, (2) perivascular infiltrate—mostly lymphocytes with some monocytes, plasma cells, and histiocytes, (3) perivascular increase in interstitial tissue, and (4) degenerative changes in the muscle fibers—loss of striation, vacuolation, fragmentation, atrophy, and fibrosis. The skin may show vacuolation of the epithelium and perivascular infiltration of lymphocytes in the cutis, some atrophy of the epidermis, and, less often, flattening of the rete pegs and edema or fibrosis of the cutis.

Jager and Grossman¹² described muscle changes in 8 patients with dermatomyositis but found similar nonspecific changes in 19 other muscle biopsies from patients without dermatomyositis.

Traut and Campione¹⁸ described the histo-

pathology of muscle in rheumatoid arthritis. Sixteen patients with severe rheumatoid arthritis had gastrocnemius muscle biopsy. Most of this group demonstrated atrophy and an increase in the number and size of sarcolemmal nuclei. Mild perivascular infiltration was observed in 15 of the 16 patients with rheumatoid arthritis. After comparison with biopsy material from dermatomyositis, they felt that they differed quantitatively rather than in kind of reaction from the muscles in rheumatoid arthritis—infiltration was more marked and the degeneration more extensive.

TREATMENT

Perhaps the most important treatment indicated in all cases is physiotherapy with orthopedic consultation. With the somewhat unpredictable prognosis in dermatomyositis, any isolated case report is difficult to evaluate. However, the recent literature includes the following: in Wedgwood's series of 19 patients, 11 received cortisone or ACTH for a variable length of time. ACTH was given in dosage of approximately 100 mg. per day for two to three weeks, and 50 to 200 mg. of cortisone per day was given on the basis of 100 mg. per square meter per day. These agents were used in the acute stage of the disease and reported as possibly helpful in 9 patients and of no benefit in 2. Improvement was characterized by "decrease in fever, subsidence of skin lesions, less muscle pain and tenderness, and increase in muscle strength." Testosterone in dosage of 30 to 50 mg. per day for periods of one month to one year was reported as possibly helpful in 10 patients and of no benefit in 2. It is not clear from Wedgwood's paper how long a period of time testosterone was used in combination with ACTH and cortisone in these cases.

The only impression of the Mayo series¹⁷ is that steroids were used in 9 children with "a good response observed in the majority with 50 to 100 mg. of cortisone administered daily." In patients of all ages, 28 were improved (9 permanent remissions), and 15 were unimproved.

The series of Everett and Curtis* at Michigan included 8 patients treated with corticotropin and/or cortisone derivatives. Five were considered to have had an adequate trial of therapy and "none had demonstrable objective improvement other than temporary suppression of fever and erythema. . . . Only 2 subjectively improved, and 1 of these died." Individual case reports, such as those of Ragan,¹⁹ Oppel and associates,¹⁶ and the recent pathological conference,¹¹ suggest the value of steroids.

TABLE 1
SYMPTOMS

Case	Age at onset	Sex	Weak- ness	Indu- ration	Facial rash	Skin change over joints	Contract- ures	Pain or tender- ness	Fever	Peri- orbital edema	Respira- tory dif- ficulties	Palatal involvement
1	6 mos.	F	+	+	+	+	+	+	+	+	±	0
2	7 yrs., 6 mos.	M	+	+	+	+	+	+	+	+	+	+
3	13	F	+	+	+	+	+	+	+	+	0	0
4	5	M	+	+	+	+	+	±	±	+	0	0
5	7 yrs., 10 mos.	M	+	+	+	+	+	+	+	+	0	0
6	6 yrs., 9 mos.	F	+	+	+	+	+	+	±	+	0	0
7	8	F	+	+	+	+	+	±	±	+	+	0

TABLE 2
LABORATORY

Case	Biopsy	ESR	L.E.	Urine	ASO	CRP	A/G	Calcinosis
1	+	17 52	Neg. x 3	Neg.		0	4.5/2.4	+
2	+	45	Neg. x 5	Neg.	250	0	1.8/5.4	—
3	+	26 49	Neg. x 6	Neg.	100	0	3.3/4.1	—
4	+	19 92	Neg. x 2	Neg.		0	T.P.—8.4	+
5	+	25 70	Neg. x 2	Neg.	50	0		+
6	+	29 73	Neg. x 5	Neg.	500 100 50	0	3.4/4.1	—
7	+	35	Neg. x 3	Neg.	125	2+	3.3/3.8	—

TABLE 3
COURSE

Case	Therapy	Present status	Duration	Age now or at death	Notes
1	ACTH for 24 days. Initially 80 mg./day. Triamcinolone, 5 mg./day for 8 months.	Active	30 mos.	3 yrs.	Now being followed in OPD at Minneapolis General Hospital.
2	Cortisone, 100 to 240 mg./day for 4 months. Prednisone, 30 to 40 mg./day for 2 months. Testosterone, 30 mg./day for 5 months.	Died	14 mos.	8 yrs., 7 mos.	Duodenal ulcer, bronchopneumonia, atelectasis left lung, and cardiac dilatation.
3	Cortisone, 325 mg./day for 2 months. Nitrogen mustard, 0.2 mg./kg. given twice.	Unknown	?	?	Family moved out of state— unable to contact. Duodenal ulcer.
4	Cortisone, 150 mg./day for 6 weeks. Triamcinolone, 15 mg./day for 14 months.	Limited activity	26 mos.	7 yrs., 2 mos.	Duodenal ulcer. At Elizabeth Kenny Institute for physiotherapy.
5	Cortisone, 200 to 300 mg./day for 2 months. Prednisolone, 10 mg./day at present.	Active	21 mos.	9 yrs., 7 mos.	At Gillette State Hospital for physiotherapy.
6	Cortisone, 200 mg./day for 30 days.	Active	13 mos.	7 yrs., 10 mos.	Now being followed in OPD at University of Minnesota Hospitals.
7	Physiotherapy, digitalis, diuretics, low-salt diet. Triamcinolone, 30 mg./day for 30 days.	Minimal activity	14 mos.	8 yrs., 10 mos.	Hospitalized at University of Minnesota Hospitals for evalua- tion of steroid therapy.

COURSE

Though highly variable, most authors suggest that dermatomyositis begins with insidious onset. Perhaps it is sudden in less than 25 per cent. In Sheard's⁹ series of 25 cases, 13 died within an average of twenty months. In the group of Wedgwood and associates,⁷ 8 of the 10 children who died succumbed between four and twenty-six months after onset. In Everett and Curtis's⁸ patients, 4 of 11 died within the first year. The Mayo¹⁷ experience leaves the general impression that, in patients who survive, the disease process becomes quiescent within the first five years.

The present status and causes of death in the Ann Arbor and Boston series are summarized as follows:

<i>Present status</i>	<i>Everett</i>	<i>Wedgwood</i>
Dead	11	10
Living	8	16
Active, few residua	4	}
Partially active	2	
Confined to bed	2	4
Disease quiescent		8
Total cases	19	26

<i>Cause of death</i>	<i>Everett</i>	<i>Wedgwood</i>
Bronchopneumonia	5	6
Cardiac failure	3	0
Hemorrhage	2	1
Calcific pericarditis	1	0
PABA toxicity	0	1
Unknown	0	2
Total number of deaths	11	10

Since Wedgwood's initial publication in 1953, a further hazard of steroid therapy and cause of death was reported at the twenty-second Ross Pediatric Research Conference on Mesenchymal Diseases in Childhood held in Salt Lake City, October 1956. Wedgwood²⁰ made the following comments: "Of the children to whom we have given steroids, 6 have died, only 1 of palatoretrospiratory involvement alone. Two died of respiratory involvement and another factor. This factor, probably the major cause of death in these 2, was a change in the gastrointestinal tract. Gastrointestinal crises suddenly developed in 5 of the 6 children, with perforation of unsuspected ulcer, paralytic ileus, and gastrointestinal hemorrhage."

CLINICAL MATERIAL

Tables 1, 2, and 3 summarize our clinical and laboratory experience with 7 cases of dermatomyositis in children.

CASE REPORTS

Case 1. This female infant developed thickened, red patches over her elbows, knees, and interphalangeal joints

at 6 months of age. This condition was initially thought to be psoriasis. At 17 months of age, she began having difficulty in walking and crawling. She was unable to raise her arms above her head. The parents observed a decrease in the circumference of her upper arms, as well as swelling of her neck, eyelids, and feet. An erythematous rash appeared with the periorbital edema. She was admitted to Minneapolis General Hospital at the age of 21 months. Low-grade fever was present. The limitation of motion in the shoulders, with hip flexion contractures, was confirmed. Her face showed the heliotrope rash about her eyes. The skin at the base of the nailbeds showed erythema. Laboratory studies included a muscle biopsy, which revealed chronic myositis. Lupus erythematosus clot tests were negative three times. Electrolytes, including calcium, phosphorus, and alkaline phosphatase, were normal. C-reactive protein was 0. The albumin-globulin ratio was 4.5/2.4. She was initially treated with ACTH in dosage of 150 mg. per square meter per day. Hypertension became a problem, and the ACTH was finally discontinued after twenty-four days without apparent benefit. At 28 months of age, she was readmitted and started on 5 mg. of triamcinolone per day. This has been continued to the present time. Extensive calcinosis is present on roentgenograms of the pelvis and lower extremities (figure 2a, b, and c). She is free of fever and pain at the present time and is walking and playing with minimal limitation.

Case 2. This boy had gradual onset of pain, fatigue, fever, and malar rash at 7½ years of age. The rash soon became evident over the dorsum of both hands, and periorbital edema was observed. Intermittent dysphagia and "nasal voice" were present. Because of progressive muscular weakness, he was admitted to the University of Minnesota Hospitals on February 9, 1955. Laboratory studies included several muscle biopsies showing severe myositis. Lupus erythematosus tests were negative five times. The albumin-globulin ratio was 1.8/5.4, and the antistreptolysin-O titer was 250 Todd units per cubic centimeter. The C-reactive protein was 0. Erythrocyte sedimentation rate was elevated throughout his course—usually near 45 mm. per hour. The boy went gradually downhill despite intensive physiotherapy. Cortisone was used initially in dosage of 240 mg. per day. This was decreased to 100 mg. per day after four months. Prednisone in dosage of 30 to 40 mg. per day was continued for another two months. Eight months after admission, a duodenal ulcer developed while the child was on steroid therapy. Testosterone propionate, 30 mg. per day, was given for five months. There was no evidence that steroids improved this boy's muscle weakness. Palatoretrospiratory involvement with late cardiac failure continued until his death fourteen months after onset of the disease. Autopsy showed complete atelectasis and bronchopneumonia of the left lung and duodenal ulceration. Microscopic sections of muscle showed striking atrophy and sarcolemmal proliferation.

Case 3. This girl had onset of weakness in her hands, arms, and legs at the age of 13 years. Within two months, she noticed erythema of the eyelids and extensor surfaces which was aggravated by sunlight. She was admitted to the Elizabeth Kenny Institute as a possible poliomyelitis patient. However, lumbar puncture and virus isolation studies were negative. Admission erythrocyte sedimentation rate was 49 mm. per hour. The albumin-globulin ratio was 2.94/3.81. Lupus erythematosus clot tests were negative five times. Muscle biopsy showed myositis with necrosis and fibrosis of muscle with infiltration of lymphocytes. Cortisone was given on the



Fig. 2a (left). (Case 1). Extensive calcinosis within soft tissue of pelvis. b (center) and c (right). Extensive calcinosis within soft tissue of lower extremities present at 30 months of age.

basis of 300 mg. per square meter per day; however, within one month, a duodenal ulcer with hemorrhage developed. During this time, there was no significant change in muscle strength. Nitrogen mustard, 0.2 mg. per kilogram, was given twice without effecting clinical change. Fourteen months after admission and after intensive physiotherapy, she continued to show more thickening of subcutaneous tissue and less range of motion. Vital capacity was 60 per cent of predicted normal at 2.3 liters. Erythrocyte sedimentation rate remained elevated. The family moved to Missouri, and the patient was transferred on March 8, 1957.

Case 4. At the age of 5 years, this white boy had onset of fatigue, weakness, muscle tenderness, and facial rash. The initial diagnosis was rheumatoid arthritis, and the child was referred to the Elizabeth Kenny Institute on May 13, 1957. He presented with a rash described as "violaceous—periorbital in distribution with edema of eyelids." Skin over extensor surfaces of joints was "dry, scaly, and red." There was marked symmetrical weakness, with contractures, minimal fever, and muscle pain. Erythrocyte sedimentation rate was 60 mm. per hour. A muscle biopsy on May 21, 1957, showed pale, vacuolated fibers and some areas with almost complete loss of sarcoplasm. Perivascular infiltrate of lymphocytes was observed. Treatment consisted of intensive physiotherapy and steroids. Cortisone was started in dosage of 150 mg. per day but decreased to 75 mg. per day after six weeks because of duodenal ulcer. Triamcinolone was started on July 29, 1957, at 15 to 30 mg. per day. Erythrocyte sedimentation rate ranged from 19 to 92 mm. per hour. The boy has been afebrile, and physiotherapy reports reveal minimal progress. Most recent films show osteoporosis and early soft tissue calcification.

Case 5. This boy had the onset of periorbital edema and a papular erythematous rash over knees, elbows, and phalangeal joints at the age of 7 years, 10 months (figure 3). Initially studied at a private hospital, he was found to have weakness, contractures, and muscle tenderness. Muscle biopsy at University of Minnesota Hos-

pitals on April 12, 1957, showed foci of lymphocytes around degenerating fibers—consistent with chronic myositis. The lupus erythematosus clot test was negative twice. The erythrocyte sedimentation rate was from 40 to 70 mm. per hour, and the antistreptolysin-O titer was 50 Todd units per cubic centimeter. C-reactive protein was 0 on 4 samples. The Trichinella skin test was negative. Treatment consisted of 200 to 300 mg. of cortisone per day for sixty days, with resultant improvement in rash, strength, and range of motion. At present, he is being followed at Gillette State Hospital for Crippled Children in St. Paul. Prednisolone is being continued in dosage of 10 mg. per day. Physical therapy is intensive. The boy is able to fully dress himself and remain fairly active about the hospital. Most recent roentgenograms show soft tissue calcinosis.

Case 6. This girl had onset of low-grade fever, "redness and swelling" of the face, and joint stiffness at the age of 6 years, 9 months. These symptoms seemed more



Fig. 3. (Case 5). Rash with periorbital erythema and edema.

severe three weeks after a severe pharyngitis. A rash was evident over the extensor surfaces of the knees, elbows, and phalangeal joints (figure 4). Periorbital edema and erythema were more obvious. Subcutaneous nodules were present over elbows, ankles, and dorsum of wrists. Lupus erythematosus clot tests were negative on 5 different samples. The erythrocyte sedimentation rate was from 15 to 73 mm. per hour. A peripheral eosinophilia of 9 to 23 per cent was observed. C-reactive protein was 0 twice and 4+ on 1 sample. Treatment consisted of 300 mg. of cortisone per square meter per day for one month. Intensive physiotherapy was carried out during the same period. Muscle testing during this time showed improvement to "no appreciable weakness" after thirty days of steroid therapy. Unfortunately, on a repeat biopsy, muscle was not obtained.

Case 7. At 8 years of age, this Negro girl had the onset of increased facial pigment. This was followed by ulceration of the volar pad of the right index finger. The extensor surfaces of the interphalangeal joints showed loss of pigment as shiny, white patches (figure 5). Periorbital and ankle edema was present, as well as marked muscle weakness and fatigue. She was unable to raise her arms above her head, close her fists, or cross her legs. Her hands tended to be cold, though her temperature on admission was 101.6° F. Examination of the heart revealed a grade III systolic murmur along the lower left sternal border. P₂ was very loud compared with A₂. Lupus erythematosus preparations were negative three times. The albumin-globulin ratio was 3.3/3.8. Because of minor motor convulsive seizures, an electroencephalogram was obtained. This showed right temporal and frontoparietal spike discharge. An electrocardiogram showed right axis deviation and right ventricular preponderance. Cardiac fluoroscopy showed right ventricular hypertrophy with an enlarged pulmonary artery segment. Right heart catheterization on December 8, 1958, showed pulmonary artery pressure 105/60, right ventricle 110/13, and right atrium 28/10. Systemic blood pressure was 110/70. Lung biopsy revealed medial thickening and loose, fibrous, intimal proliferation of arterioles. The larger arteries were uninvolved. Muscle biopsy showed atrophic fibers with some proliferation of sarcolemmal cells and minimal lymphocytic infiltrate. At the present time, this child is being evaluated after steroid therapy. It is our feeling that this case represents dermatomyositis; however, the pulmonary hypertension has been reported more frequently in scleroderma.

DISCUSSION

Since 1954, 7 cases of dermatomyositis in children have been studied at the University of Minnesota Hospitals. Of these children, 4 were female and 3 were male. One girl in the series was a Negro. Age at onset varied from 6 months to 13 years. Family histories failed to reveal other members with dermatomyositis, scleroderma, or acute lupus erythematosus.

Insidious onset characterized the symptomatology in our series. However, within weeks, the entire spectrum of skin manifestations, with the classical eyelid and butterfly heliotrope rash and extensor surface erythema, was evident. Periorbital edema was observed in all cases. Edema



Fig. 4. (Case 6). Erythema over dorsum of interphalangeal joints.

of ankles and hands was frequently present. Two children showed the chronic skin changes described as poikiloderma. The latter term is used by dermatologists to refer to the atrophy and increased pigmentation of the skin, which often occurs during the final stage of the rash of dermatomyositis.

Calcinosis was observed by roentgen examination and biopsy in 3 cases. This incidence of 41 per cent is in keeping with that observed by Wedgwood and associates,⁷ Everett and Curtis,⁸ and the Mayo Clinic group.^{6,17} Palatorespiratory involvement with severe intercostal muscle weakness and late cardiac failure developed in 1 child, and death ensued. Fever, though often present, has not been a prominent feature in our series. Several cases showed exacerbation following mild respiratory infection. In 1 child, the rash became more severe after exposure to sunlight.

Antistreptolysin-O titers were within normal limits in all except 1 patient who showed 500 Todd units per cubic centimeter at the onset of



Fig. 5. (Case 7). Loss of pigment over interphalangeal joints.

her illness. At the present time, we are unable to relate dermatomyositis to bacterial or viral infection. In contradistinction to many of the other diffuse mesenchymal diseases, the C-reactive protein determination has usually been negative in dermatomyositis. The erythrocyte sedimentation rate was moderately elevated in all cases. Routine urinalysis, including cells, protein, sugar, and acetone, has been normal. In patients in whom Addis counts were done, these, too, have been entirely normal. The lupus erythematosus factor has been absent from the serum in all of our cases. This point has been extensively studied using the Gonyea clot test on numerous occasions, bone marrow biopsy in some, and Hargraves and Weiss-Barnes techniques in others. Serum proteins tend to show elevated globulins. Electrophoretic patterns were obtained on 6 of the children. Elevation of the α_2 globulin and gamma globulin components were regularly revealed.

Examination of skin and muscle biopsies by light microscopy has demonstrated nonspecific myositis.

It should be emphasized again that patients with dermatomyositis being treated with steroids have more than the usual incidence of gastric and duodenal ulcer. In our group, ulcers developed in 3 of 6 children while on large doses of cortisone.

The question of therapy remains somewhat unsettled. Seven of our cases have been treated with steroids. It seems clear that 3 children showed

continued progression of weakness, pain, fever, and rash throughout steroid therapy. On the other hand, 4 children have evidenced a less severe course during modest steroid therapy. However, 3 of these children show calcinosis by x-ray examination. With the exception of specific change on biopsy or improvement on specific muscle testing, it is most difficult to relate prognosis to steroid therapy. This experience of failure of dramatic improvement to occur and the apparent great danger of gastrointestinal ulceration in our patients, as well as those studied by others,²⁰ raise the question of whether or not steroid hormones should be used in these patients.

SUMMARY

1. Seven cases of dermatomyositis studied at the University of Minnesota Hospitals are described.

2. The characteristic clinical manifestations observed in these cases are presented and related to the observations of others who have studied a series of cases among children.

3. At the present time, the diagnosis must depend upon the constellation of clinical manifestations.

4. The hazards of steroid therapy in this disease are again reviewed.

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Mechanism of the Acute Allergic Reaction

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IT IS WISE to review periodically the pathogenesis of some of our more commonly encountered diseases. Allergic disease constitutes a significant part of the practice of any pediatrician. A better understanding of hay fever, asthma, hives, and other clinical manifestations of acute allergic reactions can be gained by further study of the mechanisms involved. These mechanisms are better understood if they are presented by means of a diagram. Diagrammatic representations have been published previously by Raffel,¹ Trethewie,² and Mongar and Schild.³ Boyd⁴ has described the mechanisms by means of an outline. Much still remains to be learned regarding the mechanism, so that no diagram at the present time can be considered to be one of finality.

The process as I now envision it is illustrated in figure 1. The antigen enters the body by way of the respiratory tract, the skin, or the gastrointestinal tract. In some infants, the antigens enter the body via the placental circulation.⁵

The antigen then goes to an antibody-producing cell. Present evidence indicates that this is a cell of the lymphoid series,^{6,7} probably the plasma cell. Whether all antibody-producing cells are plasma cells is still unknown, though there are strong indications that they are responsible to a large degree for the production of antibodies. Ortega and Mellors⁸ also have implicated a lymphoid cell in the germinal centers of lymph nodes.

In allergic reaction, however, a special form of antibody is to be considered, that is, the reagin or skin-sensitizing antibody. Its exact site of production is unknown. Its exact reason for differing from the more conventional antibodies also is unknown. Not only does reagin behave differently from other antibodies in its inability to be precipitated, but it also differs in that it migrates in the electrophoretic field with the beta globulin rather than the gamma globulin.⁹ There is some evidence that the reagin may be in the alpha-2 or the gamma-1 fraction, though most

evidence now indicates its presence in the beta fraction. The conventional antibodies migrate with the gamma fraction. Blocking antibodies, which are produced by hyposensitization treatment, also migrate with the gamma fraction.

Apparently, an interval of about ten days must intervene between the time the antigen is introduced into the body and the time the reagin appears in the blood. Reagin is released into the blood stream where it may be demonstrated by means of the passive transfer test, the so-called Prausnitz-Küstner reaction. Some reagin becomes intimately bound with some type of cell or cells in the body. Here it may be demonstrated by means of the skin-testing procedure.

Whenever the antigen is subsequently introduced into the body, it unites with the reagin either in the blood stream or in or on the sensitized cell. Evidence exists for both sites of union. The work of Schultz¹⁰ and Dale¹¹ and others more than forty years ago seemed to exclude the possibility of union within the blood stream and seemed to implicate union only in or on the sensitized cell. The initial concept of anaphylotoxin or toxic material formed by the union of reagin and antibody in the blood stream has been reviewed recently by Silva.¹² He has been able to demonstrate that anaphylotoxin mediates its action by means of histamine and not by direct toxic action. However, one bit of evidence against the importance of anaphylotoxin, at least in the rat, has been obtained by Mota,¹³ who failed to demonstrate the presence of histamine in the plasma of sensitized rats after the introduction of anaphylotoxin. The same rats demonstrated an increase in the amount of histamine in the plasma after the introduction of antigen.

The exact cell or cells that are sensitized are as yet unknown. The mast cell is known to contain histamine and heparin and, in some species, 5-hydroxytryptamine (serotonin).¹⁴ It also may contain other chemical substances as well. It is known that as the result of an antigen-antibody reaction, the mast cell is disrupted and releases histamine. Whether this indicates that the mast cell is the only sensitized cell remains to be seen, but it certainly is sensitized. Because of this,

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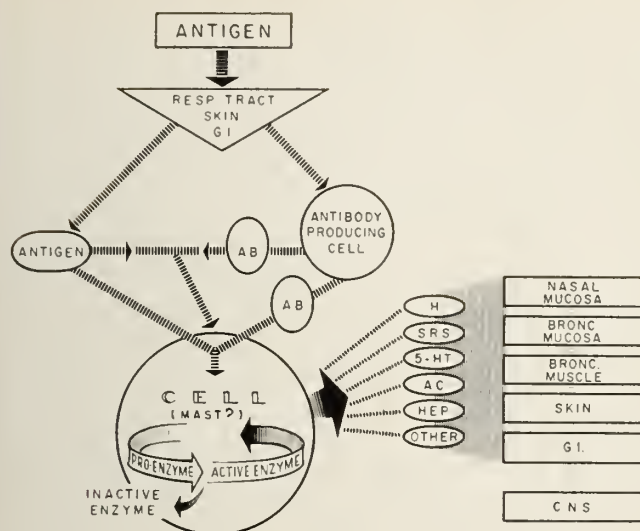


Fig. 1. Mechanism of the immediate allergic reaction. (From LOGAN, G. B.: Mechanisms of the immediate allergic reaction and some therapeutic implications. *A.M.A. J. Dis. Child.* 97:163, 1959).

the mast cell deserves further study and attention from clinicians and from laboratory workers.

Blood cells of sensitized human beings release histamine *in vitro* when exposed to the specific antigen.¹⁵ Available evidence suggests that the leukocytes¹⁶ and platelets¹⁷ may be the source of the antigen. Platelets also contain serotonin.¹⁷ It should be pointed out, however, that the platelet studies were carried out on rabbits and not on human beings.

The mechanism of release of the histamine is disputed. Mongar and Schild³ envision an enzyme mechanism which may not be too different from the mechanism conceived by Silva.¹² Mongar and Schild³ assume that a proenzyme is present within the sensitized cell. This proenzyme, under ordinary circumstances, is inactivated and is then discarded from the cell. The antigen-antibody reaction, however, changes the proenzyme to an active enzyme which, in turn, releases the histamine. These workers also were able to show that octylamine and 48-80, which are known histamine-releasing substances, release their histamine by a mechanism that is different from the antigen-antibody reaction. The antigen-antibody reaction releases histamine from the intact mast cell only, whereas the chemical releasers can release histamine either from the intact cell or from the released granules.

The antigen-antibody reaction also releases other chemical substances which may be termed "chemical mediators." One of these, heparin, has been mentioned. This is released in the dog.¹⁸ How much of it is released in other species is somewhat uncertain.

Slow-reacting substance A, a compound of unknown chemical composition at the time of

this study, is released during the acute allergic reaction. This substance was so named because of the slow contracture which it caused in the ileum of the guinea pig during experimental studies, quite in contrast to the quick action produced by histamine.¹⁹ Its release from shocked sensitized tissue of human beings has been demonstrated as well as its release from shocked sensitized guinea pig tissue. SRS-A is a strong bronchial constrictor, and, hence, is probably responsible for some of the latter part of the acute asthmatic reaction.

In some species, 5-hydroxytryptamine is released during the acute allergic reaction.²⁰ It is known that it is released in the rat and the mouse. How important a factor it is in human beings remains to be proved. Some evidence suggests that it is not so important as was once thought, though, at the present time, it cannot be disregarded.²¹

Acetylcholine is another chemical mediator. This substance is present and mediates the nerve impulse at the myoneural junctions. Its source of release during the acute allergic reaction is unknown. It is felt by some, particularly the Japanese workers, to be an even more important chemical mediator than histamine.²²

Other factors, such as substance P, potassium, and other electrolytes, may be important. Between the point of release of these chemical mediators and the point of action on the end organs, that is, on the smooth muscle and blood vessels of the end organs, are destroying mechanisms. These are probably enzymes but may be other substances which destroy or inactivate the chemical mediators. Parrot and Laborde²³ have demonstrated that in addition to histaminase

there is at least one other means by which histamine can be destroyed. They call this "histaminopexy." The importance of this mechanism remains to be proved. Whether or not the presence or absence of some of these destroying enzyme systems or other substances determines whether a person is going to be "sensitive" to one or more of the chemical mediators is a possibility. Still unknown is why, during an acute allergic reaction when various chemical mediators are being released, hay fever develops in one person, asthma in another, and hives in another.

Adrenal cortical hormones play a role in influencing the acute allergic reaction. Their exact mode or modes of action are still known only imperfectly. They affect production of antibodies^{24,25} and metabolism of histamine^{26,27} and have an antiphlogistic or anti-inflammatory reaction.²⁸ The latter is probably the most important effect in human beings. Still other effects may occur, but they are not now known.

SUMMARY

This brief review may be summarized by pointing out the genetic and therapeutic implication of acute allergic reactions. It has been stated that allergic disease has an hereditary factor,

and such seems to be the case.⁴ However, it is evident that no one gene can carry such a complicated defect. Undoubtedly some people have the defect in the antibody-producing cell, in the mast or sensitized cell, in the enzyme-destroying mechanism, or possibly in other places. Still others may have a combination of various factors. Thus, the pediatrician probably is not dealing with a single defect but with multiple defects, which may produce the same clinical picture, a not too dissimilar concept from that held at present for patients having hemophilic diseases.²⁹ Epinephrine, ephedrine, the theophylline compounds, iodides, and the antihistamine drugs give purely symptomatic relief, since all of them exert an effect on the end organ only. It should be evident also that once the sensitized cell is attacked, no form of treatment will help that particular cell. Going back one step further, however, it may be seen how hypersensitization, by introducing blocking antibodies, can prevent the union of antigen and reagin. Finally, however, it may be seen that by meticulous environmental control, the antigen will not be permitted to enter the body, and this entire chain of events will be prevented from taking place.

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Prognosis of Fetuses at 33 Weeks' Gestation in Rh-Sensitized Women Who Have Had Preceding Stillbirths

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THE TOTAL PROGNOSIS for the fetuses of women who are Rh sensitized and who have had a preceding stillbirth is known to be extremely poor. In this special group of women, fetal mortality is approximately 80 per cent.^{1,2} The fetal wastage that continues to occur in this group of women therefore constitutes a particular therapeutic challenge.

Delivery at or before 35 weeks of gestation is one of the methods advocated as a means of reducing the mortality rate. Early termination of the contact with maternal antibodies has been considered as a method of preventing the erythroblastosis from progressing to severe hydrops and subsequent death in utero. Because of this theoretic reason, several groups³⁻⁵ have been practicing early delivery of the fetus in these special circumstances.

The results obtained by early delivery have been difficult to analyze because no true control series have been presented. Instead, evaluation has been made by comparing the results of early delivery with the 80 per cent total fetal wastage previously noted for this group. This analysis is unfortunately biased, since the groups considered are not comparable. All the fetuses in the early delivery series were alive and had reached viable gestation age at the time pregnancy was interrupted. By contrast, the total fetal wastage included many fetuses which had died in utero before the time of extrauterine viability and before the stage of gestation in which early delivery is practiced.

In this series, therefore, the final survival rate in this group was calculated from the number of fetuses alive at 33 weeks' gestation for which

early interruption of pregnancy was not practiced. To accomplish this, the case material at the University of Minnesota Hospitals was reviewed.

UNIVERSITY OF MINNESOTA HOSPITALS SURVEYS: 1945-1957

This survey was conducted by a retrospective analysis of all of the charts coded under either erythroblastosis fetalis or hemolytic disease of the newborn. Livebirths, stillbirths, and fetal deaths in utero were all included.

We have accepted the following manifestations as indicative of Rh isoimmunization:

1. An Rh-positive infant with a positive Coombs' reaction.
2. An Rh-positive infant who has definite jaundice in the first 24 hours of life and whose mother is Rh sensitized.
3. Any stillborn from a sensitized Rh-negative mother.
4. Infants in whom diagnosis was based on pathologic characteristics when serologic proof was incomplete.
5. Hydrops fetalis where no other cause could be found.

The definition of stillborn has included (a) fetal weight of at least 1,000 gm. and (b) an infant who shows no evidence of life after birth and whose period of gestation is 20 weeks or more.

Data. As noted in table 1, there were 119 live-born, Rh-erythroblastotic infants at the University of Minnesota Hospitals during the years 1945-1957. Since this hospital has only referred patients, an analysis of the severity of the hemolytic disease is important. Sixty of the infants

TABLE 1
REVIEW OF RH-ERYTHROBLASTOTIC LIVEBORN
INFANTS*

Number of liveborn erythroblastotic infants	119
Number of Rh-erythroblastotic liveborn infants whose maternal history included prior stillbirths	12

*University of Minnesota Hospitals Records, 1945-1957.

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TABLE 2
REVIEW* OF RH-ERYTHROBLASTOTIC LIVEBORN INFANTS WHOSE MATERNAL
HISTORY INCLUDED PRIOR STILLBIRTHS

No.	Group Rh type	Prior pregnancies			Index pregnancy		Antibody titre	Sex	Weight (kg.)
		Year	Duration	Result	Duration and type delivery				
1	O Rh—	'37 '41 '43	Term 38 wks. Term	Normal Stillbirth Stillbirth	40 wks.	spont.		F	3.3
2	A Rh—	'41 '43 '45 '46	Term Term 7½ mos. Term	Normal Rh+ Normal, jaundiced Rh+ Born alive, died 10th day of jaundice Stillbirth	40 wks.	spont.		M	3.5
3	Rh—			Stillbirth	40 wks.	spont.		M	3.8
4	O Rh—	'47 '48 '49 '50	Term Term 30 wks. 37 wks.	Normal Stillbirth Stillbirth, autopsy proved Stillbirth, autopsy proved	37 to 38 wks.	c. sec.	1:32 albumin	M	2.6
5	A—	'35 '36 '37 '39 '43 '44 '45 '47	2 mos. Term Term Term Term 2 mos. Term Term	Miscarriage Normal Stillbirth "fluid" Died 3 hrs. (E.F. on autopsy) Dead 3 hrs. Miscarriage Hydrops Stillbirth	38 wks.	c. sec.	1:16 albumin	M	2.2
6	O—	'46 '49 '50 '51	Term Term Term 38 wks.	Normal Stillbirth, autopsy proved Stillbirth, autopsy proved Normal (cesarean section)	37 wks.	c. sec.	Ind. Coombs' 1:128	F	2.4
7		'51 '53 '54	Term Term Term	Normal Normal Stillbirth	37 wks.	c. sec.		F	3.3
8	A—	'53 '54	Term 27 wks.	E.F. Exchanged 2 times Fetal death in utero	33 wks.	c. sec.	1:500 albumin		
9	B—		Term Term '50 8th mo. '51 9th mo. '53 10th mo. '54 Term	Died first week E.F. (jaundiced) Stillborn Stillborn Stillborn E.F. (jaundice)	40 wks.	spont.	Ind. Coombs' 1:128	F	3.5
10	A—	'47 '48 '49 '50 '52 '54 '55	Term Term Term Term Term Term Term	Normal Died 6 hrs., cause unknown Normal (?) early jaundice E.F. E.F. Multiple transfusions E.F. Stillborn 8 lb. macerated fetus	36 wks.	c. sec.	Ind. Coombs' 1:256	F	2.7
11			Term 5 mos. Term	Stillbirth Miscarriage Normal, exchange	39 wks.	spont.	Ind. Coombs' 1:8	M	2.8
12	B—	'54 '55 '56 '57	32 wks. 2 wks. 40 wks. 20 wks.	Normal Abortion Stillbirth Died	37 wks.	induct.	Ind. Coombs' 1:2048	F	2.7

*University of Minnesota Hospitals Records, 1945-1957.

Group and type	Coombs'	Cord		Infant Index History		Hepato-spleno-megaly	Normo-blasts per 100 wbc.	Reticulo-cytes per cent	Exchange transfusion and time	Outcome
		hemoglobin (gm. per cent)	bilirubin (mg. per cent)	Lowest hemoglobin and time (hrs.)	Highest bilirubin and time (hrs.)					
O+	Early jaundice			13 (30)	15 (48)	+++	473		2 small transfusions	Living
	Jaundice at 6 hrs.			18 (96)		++	100		Haptene	Living
+	Jaundice at 4 hrs.			12 (12)	12 (12)	++++			Exchange	Died†
	4+	8.5			20 (24) 32 (48)	++++			Exchange	K.I. (died)†
O+	+	13.5	7.3			++				Living
O-	+	4.5		11 (24)	13 (24)	++			1 hr. 3 hr. 24 hr.	Living. Inspissated bile syndrome
A+	+	8.0	5.0	10 (48)	14 (24)	++	74	32	12 hr.	Living
				Spont. respiration					1 hr.	Died
O+	+			9.5 (12)	7.0 (12)		150	18	16 hr.	Living
A+	+	7.7	3.9	8 (48)	16 (36)	+	19	27	40 min.	Living
A+	+		8.0	4 (4)	11 (4)	++	56	26	6 hr.	Living
B+	+	11.3	5.0	10 (64)	15 (48)	++			40 min.	Living

Infants 3 and 4 were both born spontaneously and alive. They were born at a time when knowledge covering requirements for exchange transfusions was still meager. Both infants may be considered to be completely salvageable in our present knowledge and experience.

were sent in for treatment of a rising bilirubin. The remainder of the liveborn newborns were delivered at the University Hospitals. Their mothers were referred here mainly because of the severity of manifestations of Rh isoimmunization as reflected in elevated titers or previous pregnancies which had ended in fetal or newborn death.

For the entire group of 119 liveborn infants, the average cord blood hemoglobin was 12.8 gm. per cent with a range of 2.9 to 20.6 gm. per cent. The cord hemoglobin is the single best indication of the degree of severity of erythroblastosis.⁶ The hemoglobin range, mean and X^2 analysis indicates no significant variance from Mollison's series.⁶

Of these 119 liveborn infants, 12 had a maternal history which included prior stillbirths. These 12 liveborn infants and the related maternal histories are detailed in table 2. In this table, the historic data concerning the prior pregnancies are listed next to the clinical and laboratory data of the index pregnancy and infant.

Three maternal histories, No's. 6, 9, and 11, are of special interest because they are cases in which liveborn and nonhydropic infants followed previous stillbirths.

Two neonatal deaths, No's. 3 and 4, would be considered preventable today in the light of advances made in methodology and indications for exchange transfusion.

Infant No. 8 was severely hydropic at birth, despite delivery at 33 weeks of age, and died after resuscitation methods failed.

As noted in table 2, there were 4 instances of deliveries at 36 to 37 weeks' gestation and 1 early delivery at 33 weeks. The remaining 7 were all delivered at or near term—38 to 40 weeks. Therefore, only 1 infant was delivered before the 35 weeks of gestation, and that infant died. Since the proponents of early delivery recommend induction of these infants between 33 to 35 weeks of gestation, the present series represents a group of patients who, by these criteria, have not been subjected to early induction.

Of 12 infants in table 2, 9 are alive and well. Severity of the hemolytic process may be judged by the cord hemoglobin, 4.5 to 13.5 gm. per cent, with an average of 8.9 gm. per cent.

In addition, the survey revealed that there were 21 Rh-sensitized mothers who had had either a fetal death in utero or a stillbirth (table 3). Of these, 13 had a history of prior stillbirths. In table 4, details are given of the Rh-erythroblastotic stillborns or fetal deaths in utero whose maternal history indicated prior stillbirths. The

TABLE 3
REVIEW OF RH-ERYTHROBLASTOTIC STILLBORNS OR
FETAL DEATHS IN UTERO

Number of fetal deaths or stillborns due to Rh sensitization	21
Number of Rh-erythroblastotic fetal deaths or stillborns whose maternal history included prior stillbirths	13

only fetuses to have survived beyond the 33 weeks were No's. 10 and 11.

The results of the data obtained from this survey are summarized in table 5. In the present series, there were 14 instances in which the fetus was alive at 33 weeks' gestation. The final survival rate of the fetuses alive at this time was 64 per cent. The deaths included 2 patients with neonatal kernicterus, 1 with hydrops fetalis, and 2 stillborns.

DISCUSSION

Fetal death remains the unsolved problem in erythroblastosis fetalis. Any method which will reduce fetal loss among sensitized women who have had prior stillbirths or hydrops is to be welcomed. The studies in this direction by Kelsall and Vos,³ Walker and associates,⁴ Chown and Bowman,⁵ and Bowman⁷ are indicative of need for action in this unfortunate group of women. With the improvement in therapy for the newborn afflicted with hemolytic disease, a re-evaluation of the indications for early induction is appropriate.

However, the data presented in this review suggest that a note of caution be exercised in accepting at face value the conclusions reached by the aforementioned authors. The data demonstrate that there is a wide spectrum of manifestations due to Rh isoimmunization. The 64 per cent survival rate reported here indicates a more favorable outlook for fetuses alive at 33 weeks' gestation than is indicated by previous reports. In the light of such variability, a controlled study would seem essential to be certain that early induction of labor is beneficial to this unfortunate group of women.

Davis and associates⁸ have presented interesting data concerning the outcome of pregnancies subsequent to the *first* affected child of women who are Rh sensitized. They have defined as "severe" those infants who were either hydropic or stillborn. The following results were observed in 135 pregnancies subsequent to a severely involved *first* affected child: severe, 41; mild or normal, 74; and abortions and miscellaneous, 20.

From this unselected material, an appraisal of

TABLE 4
REVIEW OF RH-ERYTHROBLASTOTIC STILLBORN INFANTS WHOSE MATERNAL
HISTORY INCLUDED PRIOR STILLBIRTHS

No.	Prior pregnancies			Index pregnancy			Index stillborn	
	Year	Duration	Result	Anti D titre	Year delivered	Type of delivery	Gestation age	Weight gms.
1	1946	Term	Normal	1:2000 A.	1952	Ind.	26 wks.	450
	1947	3½ mos.						
	1948	Term	Normal					
	1949	33 wks.	Stillborn					
2		Term	Normal Stillbirth Stillbirth	1:2000 A.	1952	Spont.	26 wks.	2,050
3	1948	8 mos.	Stillbirth	1:1000 A.	1952	Spont.	26 wks.	
	1950	7 mos.	Stillbirth					
4	1947	Term	Normal	1:4096 C.	1955	Spont.	26 wks.	
	1948	Term	Stillbirth					
	1949	30 wks.	Stillbirth					
	1950	37 wks.	Stillbirth					
	1952	37 wks.	Alive (cesarean section), dead with K.I. in 2 days					
5		Term	Normal	1:256 A	1953	Spont.	28-32 wks.	
		Term	Normal					
		Term	Born alive, died 1 wk.					
		Term 7 mos.	Normal Stillbirth					
6	1934	Monster		1:39,000 A.	1946	Spont.	28-30 wks.	
	1935	Term	Normal					
	1940	Term	Stillbirth					
	1944	Term	Stillbirth					
7	1938	Term	Normal	1:8 A.		Spont.	29 wks.	1,400
		Term	Died 4 days; jaundiced 5 stillbirths					
8	1941	8 mos.	Normal		1954	Spont.	32 wks.	1,350
	1942	5 mos.	Macerated fetus					
	1943	8 mos.	Stillbirth					
	1944	8½ mos. 8 mos.	Stillbirth Stillbirth					
9		Term	Normal	1:512 A.	1951			985
		Term	Stillbirth					
10			Normal	1:2048 A.	1953	Spont.	35 wks.	2,260
	1950	38 wks.	Normal Stillbirth E.F.					
11	1937	Term	Normal	224 A.	1947	Spont.	38-39 wks.	
	1940	Term	Normal					
	1942	Term						
	1943	8 mos.	Stillbirth E.F.					
	1945	8 mos.	Stillbirth E.F., extra large					
12	1949	Term	Normal	1:256 C.	1956	Spont.	30 wks.	
	1950	Term	Jaundice					
	1951	Term	Normal					
	1953	Term	Stillbirth					
	1955	9 mos.	Stillbirth					
	1957	7 mos.	Stillbirth					
13	1947	Term	Normal	1:128 A.	1953		28 wks.	1,530
	1950	Term	Normal, died later					
	1951	Term	Normal, jaundice E.F.					
	1952	28 wks.	Died 2 minutes					

TABLE 5
PROGNOSIS OF FETUSES ALIVE AT 33 WEEKS' GESTATION IN RH-SENSITIZED WOMEN WHO HAVE HAD PRECEDING STILLBIRTHS

Total alive at 33 weeks	14
Table 2 — Liveborn infants	12
Table 4 — Stillborn	2
Total dead	5
Table 2 — Neonatal kernicterus	2
Hydrops fetalis	1
Table 4 — Stillborn	2
Survival percentage of those alive at 33 weeks' gestation 9/14, or 64%	

survival after a prior stillbirth may be obtained. If one considers only those infants who were alive at 33 weeks' gestation and eliminates the abortions and miscellaneous group, there would be 74 of 115, or 64.4 per cent, normal or mildly affected infants following the first child who was severely affected.

Mollison⁶ gives the following illustrative history, which he states should "make one cautious in interpreting occasional apparent successes in the treatment of sensitized pregnant women."

Mothers' serum contained Rh antibody. Husband was CDe/cDE

1. Normal infant
2. Normal infant, slight jaundice
3. Stillbirth
4. Hydrops fetalis
5. Moderately severe hemolytic disease; recovered
6. Stillbirth
7. Mild hemolytic disease (cord hemoglobin concentration 14.4 gm. recovered)
8. Mild hemolytic disease (cord hemoglobin 17 gm., direct Coombs' positive uncomplicated, highest bilirubin 10 mg. recovery)

In 2 series, an attempt has been made to study controls.^{3,4} However, no truly alternate control series has been reported. In Kelsall and Vos's³ report, difficulty arises from the fact that there was a disproportionate number of fetal deaths before 35 weeks' gestation in the spontaneously delivered group as contrasted with the group of patients induced prior to term.

In 1957, Walker and associates⁴ concluded that induction at 36 to 37 weeks reduced over-all mortality. Further analysis of their data is needed, however, since they report 5 neonatal deaths in the induced group in the text but not in the tables. The following is taken from table 4 as prepared by Walker and co-workers:

Results in pregnancy reaching 35 weeks' gestation with a living and not hydropic fetus		
	Livebirth	Stillbirth
Induced labor	23	2
Spontaneous labor	5	7

This table can be changed to indicate the 5 neonatal deaths in the induced group of patients as follows:

	Surviving	Neonatal deaths and stillbirths
Induced labor	18	7
Spontaneous labor	5	7

This difference in favor of induction could be obtained from the same population 1 out of 12 times by chance alone ($X^2=3.17$).

The survival rate in the induced group of Walker et al.⁴ is 18 of 25, or 72 per cent. The total survival rate of the induced group of Chown and Bowman⁵ and Bowman⁷ is 14 of 18, or 78 per cent. These results are not much different from the rate of 64 per cent noted in the present series.

The similarity of the results of these series indicates that there is much variability in the manifestations of Rh isoimmunization even in this group. The data also suggest that the theory of continued progression of the in utero erythroblastotic process may be questioned. The pertinent data are those of Mollison.⁶ He states that in a carefully controlled series, there was no difference in cord hemoglobin levels between the infants born spontaneously and those in whom early induction was used. Of the infants born at term, 70 per cent had a hemoglobin level greater than 11 gm. per cent. Of those born at 36 weeks, 67 per cent had a concentration greater than 11 gm. per cent.

These observations cast doubt on the assumption that there is an inevitable progression and increasing severity of the hemolytic process in the last few weeks of intrauterine life. Rather, there is the suggestion that many fetuses may become involved to a certain degree and that then the disease progresses no further.

CONCLUSIONS

1. A retrospective study of the prognosis of fetuses alive at 33 weeks' gestation in Rh-sensitized women who have had preceding stillbirths is presented. From 1945 to 1957, 119 liveborn infants and 21 fetal deaths in utero were recorded at the University of Minnesota Hospitals.

2. In the mothers of 12 of the 119 liveborn infants and in 13 of the 21 fetal deaths in utero, a history of prior stillbirths was obtained.

3. Eleven of these 25 pregnancies resulted in a dead fetus in utero before the thirty-third week.

4. Of the remaining 14, who were alive at the thirty-third week, there were 2 stillbirths, 1 hydropic infant, and 2 neonatal deaths due to kernicterus.

5. Thus, the final survival rate was 9 of 14, or 64 per cent.

6. The present series and review of the literature indicate great variability of the effects of isoimmunization. It is suggested that controlled clinical studies are necessary if convincing evi-

dence of the value of the early interruption of pregnancy is to be obtained.

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MYOMECTOMY in the third trimester may occasionally become necessary for torsion of a pedunculated myoma. Degenerating tumors, however, are best treated by bed rest unless the myoma is large. Incompetence of the cervix, resulting in habitual middle trimester abortion, is rare but may be corrected by purse-string closure of the cervix. The patient should be delivered by cesarean section in the thirty-eighth week.

ROBERT H. BARTER, M.D., George Washington University, Washington, D.C. *Clin. Obst. & Gynec.* 1:963, 1958.

A MEAN INCREASE in cardiac output of 19.7 per cent was reported in 16 of 20 patients in active labor. A proportional rise in heart rate also occurred, but stroke volume was not altered. Effects are not accumulative. After the uterus is emptied, however, cardiac output increases 18 per cent. Heart rate usually decreases, but stroke volume rises 50 per cent. Output is still elevated on the fourth postpartum day. The patient's reaction to pain, anxiety, and muscular activity and squeezing of blood from uterine sinuses probably account for increased output during contractions. After delivery, increased venous return accounts for higher output.

JOHN Q. ADAMS, M.D., and ALBERT M. ALEXANDER, JR., M.D., University of Tennessee, Memphis, and the City of Memphis Hospitals. *Obst. & Gynec.* 12:542, 1958.

Aganglionic Megacolon in the First Year of Life

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SINCE PHYSICIANS BEGAN caring for children, they have been confronted with the problem of constipation. To review in detail the medical problems associated with constipation is inappropriate for this presentation. Rather, it is the hope of the essayists to review some of the surgical aspects of constipation associated with aganglionic megacolon during the first year of life.

Since this pathologic defect was first described and since Swenson and his colleagues demonstrated the appropriate surgical cure of aganglionic megacolon in 1949,¹ the surgical management of this variety of chronic constipation in older children has made rapid strides forward and can easily be placed on a firm anatomic basis.

The treatment of the newborn child who has intestinal obstruction due to a segment of aganglionic colon, however, has not kept pace with the progress of therapy in older children. The most likely reason for this lag in treatment rests on the fact that the classical description of Hirschsprung's disease in 1888² as a condition of the newborn was soon overlooked because most children in whom this disease was diagnosed were 3 to 6 years old. In truth, an aganglionic megacolon that does not cause symptoms within the first few days of life is very rare indeed. The problem is of such magnitude that Dr. Swenson's text *Pediatric Surgery*, published in July 1958, devotes an entire chapter to it.³

This lag in therapy is somewhat harder to understand when we consider that in 1924, Dalla Valle described the absence of ganglion cells in the sigmoid as the cause of intestinal obstruction leading to death in newborns with megacolon.⁴ At that time, he also emphasized the familial incidence of this deficiency of ganglion cells and

reported the cases of 2 brothers who died in the newborn period from this disease.

The purpose of this paper is to outline current concepts of the treatment of this disease when it is encountered in the first year of life⁵⁻⁸ and to support these ideas with 2 case reports from recent experience.

Since most patients with a diagnosis of aganglionic megacolon in the past decades were older children and since all of them had symptoms beginning in infancy, it is obvious that all children with this disease do not die in the newborn period if no surgical treatment is carried out. However, the mortality generally reported for symptomatic aganglionic megacolon during infancy is in the order of 25 per cent. Any program which can significantly reduce this figure is worthy of serious consideration.

In our experience with this disease, we have found no way to differentiate between the children who can be carried along with a conservative program of laxatives and enemas and those in whom a fulminating enterocolitis will suddenly develop and who will rapidly become too ill to be helped by colostomy or enemas and antibiotics. This difficulty is illustrated by the first case report.

Case 1. W. M., a 2½-month-old white male, was admitted to a Minneapolis hospital with a history of vomiting after feedings and constipation beginning soon after birth. The formula and feeding schedules had been changed several times without a change in his symptoms. A roentgenogram of the stomach revealed regurgitation into the esophagus but was otherwise normal. A barium enema (figure 1) revealed a narrow rectosigmoid with spastic irregular contractions of this area. The colon proximal to this area was markedly dilated. The roentgen diagnosis was Hirschsprung's disease. Shortly after this, a perirectal abscess developed and, when this cleared, the infant was sent home with the idea of managing the megacolon conservatively to determine whether or not a colostomy was needed.

Four days after discharge, the child died suddenly at home, and autopsy revealed acute pseudomembranous colitis proximal to the transition zone in the rectosigmoid. No ganglion cells were present distal to this zone.

We feel that this case is especially significant

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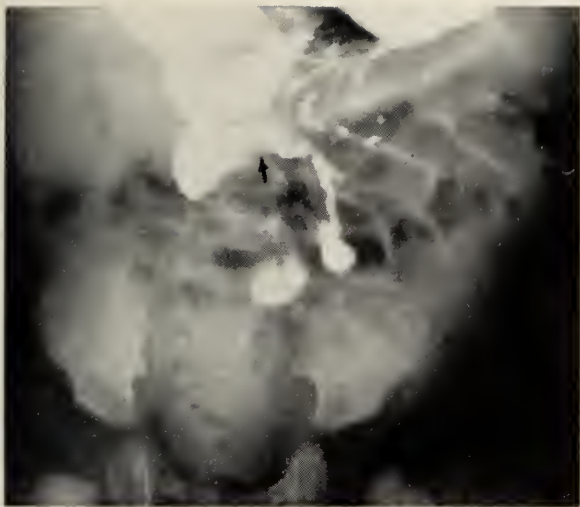


Fig. 1. Narrow rectosigmoid. Colon proximal to this area is markedly dilated.

because, at the time of discharge, he was asymptomatic and no findings on physical examination suggested that enterocolitis was present.

Because of experiences such as this, which most people who deal with this problem have encountered all too frequently, pediatric surgeons have unanimously come to feel that an infant who has symptomatic aganglionic megacolon has the best chance of surviving until he is large enough to safely tolerate a resection of the aganglionic segment if a colostomy is performed. This may be done anywhere proximal to the obstructing transitional zone which lies just above the aganglionic segment.

As in most lesions of the newborn, the key to diagnosis is consideration of the possibility that aganglionosis may be the cause of the symptoms. Once this possibility is considered, the diagnosis can readily be established or excluded. If the plain film of the abdomen shows either complete or partial intestinal obstruction with gas in the colon, a large bowel study with a thin barium mixture or a trickle of Radiograffin will frequently be pathognomonic. In doing the colon study, it is important for the radiologist to know that megacolon is suspected, since the technic is so different from a routine barium enema. Only small amounts of contrast solution are used; larger amounts may be difficult to remove and frequently obscure the transitional zone, which is the diagnostic feature of the disease. It is also preferable in cases of megacolon not to attempt to cleanse the colon before the contrast study. The changes in caliber of the colon are of such short duration that, with adequate cleansing, the colon may appear normal on examination. An-

other important technical point is the way in which the radiologist's catheter is introduced, which should be just across the anorectal threshold. If it is inserted too far, a short aganglionic segment may be overlooked.

If there is still doubt after the low colon study, rectal wall biopsy will settle the question. If ganglion cells are present, other causes of constipation or obstruction should be considered.

If ganglion cells are absent, a colostomy is done either in the transverse colon or in the sigmoid just proximal to the transitional zone. In our experience, once a colostomy is performed, these children generally do well and gain weight normally, so that the definitive pull-through procedure can be done with safety between 18 and 24 months of age.

The second case illustrates this method.

Case 2. D. C., a 5-month-old white male, was born at term by normal delivery. At 2 days of age, abdominal distention and vomiting developed. His initial meconium seemed tenacious and was dislodged only after several saline enemas. He then seemed to do well until discharge at 10 days of age. When he was 2½ months old, after it had been noted that he was a small eater and inclined to constipation, abdominal distention again occurred with vomiting and obstipation. A roentgenogram revealed large bowel obstruction with a mass in the right lower quadrant, which was thought to be intrinsic in the colon. Three days later, repeat roentgenograms showed no change. Exploratory laparotomy, performed in his home community, revealed only thickening and dilation of the sigmoid colon. No obstructing lesion was found, but a fecal impaction was dislodged. Postoperatively, he did well and was discharged eight days later after having apparently normal stools. At home, he had no stools and was seen eight days after discharge, and the diagnosis of megacolon was suspected after x-rays were taken. He was then transferred to a Minneapolis hospital where a colon study (figure 2) showed narrowing of the rectosigmoid with disorganized contractions of this segment,



Fig. 2. Narrow rectosigmoid in aganglionosis.

which is diagnostic of aganglionosis. Rectal wall biopsy confirmed the absence of ganglion cells, and a transverse colostomy was established. The child did well post-operatively and was discharged with a normally functioning colostomy in anticipation of later definitive surgical correction.

SUMMARY

The present consensus among pediatricians and pediatric surgeons is that children less than 1

year of age should have a completely diverting colostomy performed as soon as feasible after the diagnosis of aganglionic megacolon is established. This operation provides these infants with the best chance of surviving the first year of life, at which time definitive surgical excision can be done to restore a physiologically normal colon.

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FETAL INFECTION can be rapidly and accurately detected by histologic examination of frozen sections of the umbilical cord.

A 3-cm. piece is removed from the middle of the umbilical cord, placed in 10 cc. of 10 per cent formalin, and brought to a boil. The fixed cord is then placed in cold water and frozen sections are made at 8 to 12 microns, using carbon dioxide. Sections are floated onto a cold water bath, transferred onto clean glass slides by a glass rod, stained, and examined under the microscope.

Fetal infection is shown by inflammation of the wall of the umbilical veins. Leukocytic reaction to infection is shown first by margination of leukocytes at the intima, then by infiltration of the vein wall by polymorphonuclear cells, still later by inflammatory cells which migrate into Wharton's jelly, surround the vessels, and sometimes reach the outside surface of the cord.

Of 1,300 infants delivered consecutively, 10 per cent had vasculitis. Although this figure doubtless far exceeds incidence of infection, all infants who die from fetal infection have amniotic sac inflammation.

Examination of twin placentas and cords shows infection to be ascending, as it is the amniotic sac of the first-born twin that is infected.

Infection of the newborn infant should be suspected with premature rupture of the membranes, prolonged labor, respiratory distress, opacification of the fetal surface of the placenta, or unexplained jaundice. Frozen sections make necessary treatment possible before clinical signs appear.

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Recent Concepts of Function and Treatment of Tetralogy of Fallot

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TETRALOGY OF FALLOT was originally described as a complex anomaly of the heart consisting of a ventricular septal defect, pulmonary stenosis, dextroposition of the aorta, and right ventricular hypertrophy.¹ Surgical and physiologic observations in the past ten years have refined the concepts of the anatomy and hemodynamics of this anomaly. Among the contributors have been Selzer and Laqueur,² McCord and associates,³ Edwards,⁴ and Kirklin and associates.⁵

Surgeons have noted that the dextroposition or overriding of the aorta has often been more apparent than real, and physiologic studies have demonstrated that hemodynamically the overriding may not be the determining factor in governing shunts. The pathologic specimens shown in figure 1 are from 2 patients with ventricular septal defect without pulmonary stenosis. They demonstrate that the direction of blood flow is not dependent on the origin of the aorta. Overriding of the aorta is present in both specimens; hemodynamic data obtained shortly before death are outlined in the lower part of the figure. The dotted lines represent normal dye-dilution curves, while the solid lines represent curves for the respective patients. The curve (solid line) obtained from the patient represented on the left shows a slow return of the disappearance slope to the base line, indicating a large left-to-right shunt without a right-to-left shunt. Pulmonary resistance is lower than systemic resistance, and pressure in the pulmonary artery is lower than that in the radial artery. Hence, blood from the left ventricle flows into the pulmonary artery. The data on the right show a large right-to-left shunt as manifested by early appearance of dye at the sampling site, and pulmonary resistance is higher than systemic. The overriding of the

aorta in these 2 patients had no effect upon the flow of blood through the ventricular septal defect.

Another component of Fallot's tetralogy, right ventricular hypertrophy, is secondary to the pulmonary stenosis and plays no active part in the hemodynamics of the complex.

There are, therefore, only 2 dominant anatomic features in tetralogy of Fallot: ventricular septal defect and pulmonary stenosis. The ventricular septal defect is always large, and the pulmonary stenosis is of sufficient degree to insure equal pressures in the right and left ventricles. The severity of this stenosis varies from patient to patient, and it is the degree of pulmonary stenosis that influence the relative amounts of blood that pass from the heart into the aorta and the

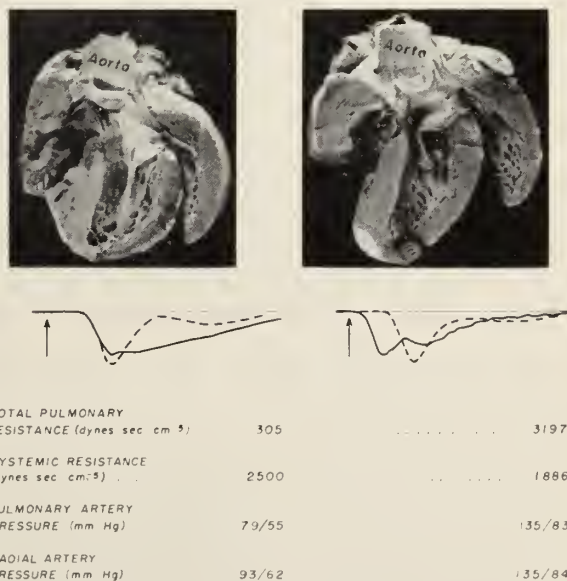


Fig. 1. Pathologic specimens from 2 cases of ventricular septal defect without pulmonary stenosis. Overriding of the aorta is present in both specimens. Hemodynamic data obtained shortly before death are given in lower part of the figure (see text). Data on left demonstrate a large left-to-right shunt without a right-to-left shunt, while those on the right demonstrate a large right-to-left shunt.

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pulmonary artery. If the stenosis is mild, the resistance to blood flow into the pulmonary artery will be less than that into the aorta. Blood will flow preferentially from both ventricles out through the pulmonary artery, and the patient will be acyanotic with a pulmonary blood flow greater than systemic. If the stenosis is severe, the systemic resistance will be less than the pulmonary resistance, and the blood will flow preferentially into the aorta. The patient will be cyanotic, and the pulmonary blood flow will be decreased.

Tetralogy of Fallot is not a static complex. Patients occupy various positions in a spectrum, their places being determined by the degree of pulmonary stenosis. Figure 2 illustrates the importance of the pulmonary stenosis. On the left is a diagram of tetralogy of Fallot with minimal pulmonary stenosis; the shunt is from left to right, the heart is large, and the pulmonary vascular markings are increased. In the center is illustrated moderate stenosis with bidirectional shunting of blood through the ventricular septal defect; the heart is of normal size, and the pulmonary vascular markings are normal. On the right, severe pulmonary stenosis is represented; the shunt is from right to left, the heart is small, and the pulmonary vascular markings are decreased.

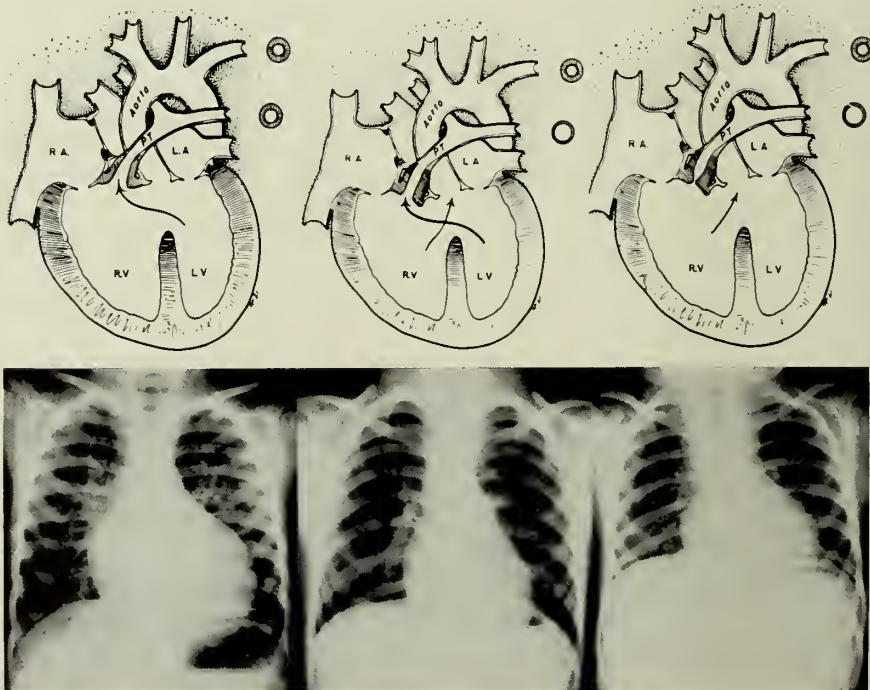
One may refer to cases with mild stenosis as "pink tetralogy" and to those with severe stenosis as "blue tetralogy." It is possible for a pa-

tient with tetralogy of Fallot to shift from the "pink" to the "blue" end of the spectrum. A large ventricular septal defect, mild pulmonary stenosis, and a large left-to-right shunt have been observed in infants in whom, as growth occurs, the stenosis may become more severe, or it may remain stationary but become relatively more severe as the heart enlarges. The patient may then show a late onset of cyanosis with typical signs and symptoms of severe tetralogy.

In 1945, the anastomotic procedure described by Blalock and Taussig⁶ for increasing pulmonary blood flow opened the chapter on the surgical treatment of tetralogy of Fallot. The Potts-Smith-Gibson⁷ operation of side-to-side anastomosis of the aorta and pulmonary artery also resulted in an increase in the flow of blood to the lungs and was somewhat easier to do in the severely ill infant. In time, Brock and Campbell^{8,9} and Sellors¹⁰ described "blind" operations in which the valvular or infundibular stenosis was relieved by passing a cutting instrument through the ventricular wall and performing an infundibulectomy or valvotomy without the benefit of direct vision.

Although these procedures often afforded marked initial clinical improvement, complications developed in approximately 35 per cent of the patients in the five to eight years following operation.¹¹ A lack of preciseness was a distinct disadvantage of "blind" infundibulectomy or valvotomy procedures.

Fig. 2. Diagrammatic representation of the intracardiac circulation in anatomic tetralogy of Fallot with mild, moderate, and severe pulmonary stenosis and roentgenograms of 3 illustrative cases. (Reproduced with permission from: EDWARDS, J. E.: Recent concepts on the functional pathology in ventricular septal defect. *Wisconsin M. J.* 56:481, 1957.)



The pump-oxygenator has given the surgeon the opportunity to repair the defects of tetralogy by the open-heart technic.^{5,12} The ventricular septal defect is closed by multiple sutures or, less commonly, with an Ivalon sponge prosthesis. The infundibular stenosed area is excised under direct vision, and the pulmonary valve, if stenotic, is opened. In about a third of the cases, the gradient across the infundibular zone falls after infundibulotomy alone; in one-third, the infundibular zone must be widened with a prosthesis of Teflon; and, in the other third, it is necessary to carry the prosthesis across the pulmonary valve ring into the pulmonary artery to effect a fall in the pressure gradient.

If the pulmonary stenosis is minimal or moderate and the symptoms are not severe, the optimal time for surgical correction appears to be at 5

or 6 years of age. However, if an infant has severe symptoms, open-heart surgical correction should be offered immediately. At present, the risk of open repair of tetralogy of Fallot is somewhat greater than that accompanying the other procedures. The over-all mortality rate is 23 per cent, with a rate of 14 per cent for those patients operated on in 1958. But the number of patients in whom good results are achieved is greater and the results are longer lasting, since the heart is returned toward normal. Consequently, open-heart repair using extracorporeal circulation is considered the procedure of choice in all age groups.

The authors are indebted to Dr. J. W. Kirklin and Dr. J. E. Edwards for their help in the preparation of this paper.

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FETAL ELECTROCARDIOGRAPHY is a valuable diagnostic aid in obstetrics. Electrocardiograms may be obtained in utero as early as eleven and one-half weeks after conception.

The fetal electrocardiogram provides rapid information concerning the viability of a fetus. Fetal heart activity can be detected two to six weeks earlier than by auscultation.

The fetal electrocardiogram suggests that the fetus ordinarily is in breech presentation early in pregnancy. Rotation to vertex presentation takes place at about twenty weeks. Diagnosis of transverse or nearly transverse presentations also should be possible.

Multiple pregnancies can be diagnosed from tracings made between the sixteenth and twenty-first weeks, thereby avoiding the risk entailed by irradiation. Cardiac abnormalities also can be detected during this period.

S. D. LARKS Ph.D., and K. DASGUPTA, M.D., University of California at Los Angeles. *Am. Heart J.* 56:701, 1958.

Lesions of the Lower Bowel, by
RAYMOND J. JACKMAN, M.D.,
1958. Springfield, Illinois: Charles
C Thomas, 347 pages, \$15.50.

Dr. Jackman has presented in this volume a most clear and accurate discussion of the pathology and clinical features of most of the conditions affecting the lower bowel. In many chapters, he has also discussed the anatomy and the physiology pertinent to the subject. The book contains a rare collection of excellent color photographs of disease processes of the lower bowel.

Because of his long experience in the Proctology Section of the Mayo Clinic, the author has stated his personal views on many subjects, some of which are at variance with the opinions of others. This, in itself, makes the book very refreshing. Dr. Jackman's ideas, however, must be acknowledged as representing the best in proctologic teaching.

Anyone interested in improving his knowledge of the diseases of the lower bowel should read this book.

WILLIAM C. BERNSTEIN, M.D.

•
The Endocrinology of Reproduction,
edited by JOSEPH T. VELARDO,
1958. New York: Oxford University Press, \$15.00

To one interested in reproductive physiology, the prospect of a new comprehensive review of the pertinent endocrinologic relationships is pleasant, for certainly no other portion of the subject is so sorely in need of correlation and unification. Even though it contributes to that end, it is not surprising that this book fails to reach the goal.

The editor avoids discontinuity of multiple authorship by making the contributors' topics as broad as possible. Some of them are truly excellent as, for example, the fresh review of the genetic aspects of sexual differentiation and development by Dr. S. A. Asdell, the beautifully concise picture of the relevant embryology by Dr. Frank A. Allen, and the nice description of the mammary gland physiology given by Dr. Ralph P. Reese. Dr. Arthur Solval contributes a sound and thorough review of male reproductive functions as well.

Unfortunately, other chapters pertaining to the hormones of reproduction, pituitary gland function, and the female reproductive system are not of the same quality. Strikingly missing are discussions of adrenal cortical function and the role

BOOK REVIEWS

of androgens in female endocrinology. The discussion of progesterone metabolism, particularly as it relates to adrenal and other ovarian hormones, seems deficient. It is unfortunate that the extragonadal effects of estrogens and progesterone are simply listed without comment. Though perhaps a token of the rapid advance of knowledge in this field, the impression of the lack of recent information in these chapters is striking.

This then is a volume of interest to those who deal with the physiology of the reproductive tract either on an academic or clinical basis. Despite the deficiencies, it is of value as an extensive review of basic endocrinology. Its exceedingly detailed and comprehensive bibliography makes it a worthwhile reference source.

THOMAS H. KIRSCHBAUM, M.D.

•
Fracture Surgery, a Textbook of Common Fractures, by HENRY MILCH, M.D., and ROBERT A. MILCH, M.D., 1959. New York: Paul B. Hoeber, Inc., 470 pages, \$17.50.

This text on fracture surgery is written primarily for the intern or resident and the general practitioner who treats an occasional fracture. The book is divided into four sections: General Considerations, The Axial Skeleton, The Appendicular Skeleton: Upper Extremity, and The Appendicular Skeleton: Lower Extremity.

In the first section, chapters on Sudeck's syndrome, plaster technique, reduction of fractures, and regional anesthesia are particularly worthwhile. In the two sections on the Appendicular Skeleton, both closed and open methods of reduction are presented, with somewhat more attention given the former in accordance with the proposed use of the book by the student or intern.

The book is profusely illustrated with both drawings and reproductions of roentgenograms.

GEORGE M. HART, M.D.

Life Insurance and Medicine, by H. E. UNGERLEIDER, M.D. and R. S. GUBNER, M.D., 1958. Springfield, Illinois: Charles C Thomas, 994 pages, \$16.50.

Most of this book is derived from a series of lectures given periodically under the auspices of The Board of Life Insurance Medicine and is primarily intended to give a broad background to those particularly interested in this specialized field of medicine. The first 400 pages include the fundamentals of life insurance and the nonmedical aspects. The medical portion follows in the next 400 pages.

Aside from its primary purpose, which is well served, there is much that is of interest to the daily practitioner which would help to brighten another facet in his understanding of clinical medicine and help him to better realize the long range effects of particular impairments as well as diseases. Impairments, not surprisingly, are frequently the modus operandi of the life insurance industry, and, more often than not by necessity, this stand, of course, has a good statistical foundation. In the chapter "Albuminuria and Renal Disorders," by Dr. Gubner, it is brought out that even trace amounts of albumin in the urine as the sole impairment, whether constant or not, appreciably increases the mortality ratios, although not sufficiently to warrant substandard contracts. One can then readily appreciate the effect of large amounts of albumin. Associated impairments, such as marked overweight, adversely influence the mortality experience.

When does blood pressure become abnormal? Dr. Gubner states in the chapter "The Natural History and Ultimate Prognosis of Hypertension" that there are two measurable adverse effects of high blood pressure: cardiac hypertrophy and an abbreviated life expectancy. "This occurs at or near the generally accepted standard of 140 mm. of mercury systolic and 90 mm. diastolic." Although the over-all average duration of life from the time hypertension is discovered is nineteen years, this figure becomes almost alarming when one pauses to consider the length of life expectancy.

Cardiologists would be particularly interested in the comments by Dr. Ungerleider in his chapter "The Electrocardiograph in Selection" and also in the chapter "The Changing Outlook in Heart Disease" by Dr. Gubner. Both authors have had

(Continued on page 20A)

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Reaching for 9B shoes and other top shelf sizes is no joke... it gave me a terrible kink in my back.



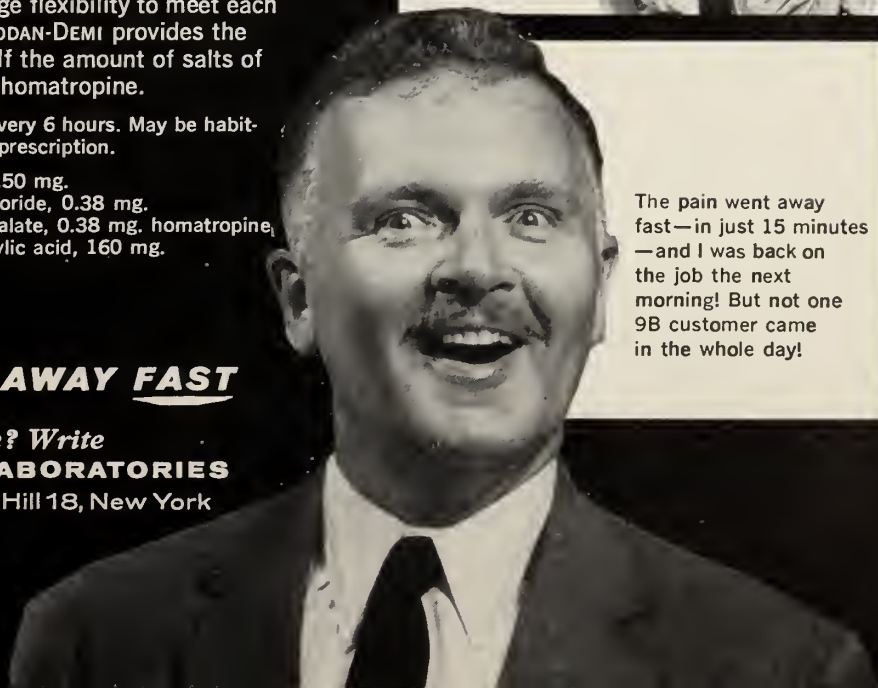
Before the day was over, I could hardly stoop to push a shoehorn.



I called my doctor that night and picked up the tablets he prescribed.



The pain went away fast—in just 15 minutes—and I was back on the job the next morning! But not one 9B customer came in the whole day!



BOOK REVIEWS

(Continued from page 290)

much experience in clinical and insurance medicine.

The chapter "Prognosis in Peptic Ulcer Disease" takes up the effect of the site of the ulcer and the age and sex of the patient, significance of past medical history, cicatrix, hemorrhage, and pyloric obstruction.

Numerous figures from the insurance industry help to point out the significance of nonoperated gallstones on mortality and the incidence of carcinoma of the gallbladder in the chapter "The Selection of Risk Involving Common Disorders of the Liver and Biliary Tract."

Although much of the medical material is somewhat basic in its approach, considerable poignant observations are prevalent throughout.

EARL OPSTAD, M.D.

Schizophrenia—a Review of the Syndrome, by LEOPOLD BELLAK, M.D., 1958. New York: Logos Press, 1,010 pages. \$14.75.

This volume is a continuation of the author's previous book, *Dementia Praecox*. The first volume was essentially a review of the literature on schizophrenia from 1936 to 1946. The present volume is a similar review from 1946 to 1956.

A serious student of mental illness should own both of these source books. They are not for the lay reader and, by and large, are reference works. Both represent a gigantic task, and the author and co-authors are to be commended highly for making this data available. Reviews of 4,475 articles in English and foreign literature are included, and the bibliography is divided into suitable sections. This book is recommended without reservation.

DONALD W. HASTINGS, M.D.

Religious Doctrine and Medical Practice, by RICHARD T. BARTON, M.D., 1958. Springfield, Illinois: Charles C Thomas, 94 pages. \$3.75.

This book contains a brief outline of the major religions of the world and how their beliefs frequently enter into the conduct of the physician's practice. Each religion is dealt with under the headings of history, nature of disease, diet, role of the physician, therapy, and mind cure.

The book is a most helpful guide for the doctor who wishes to be wise and understanding in the treatment of the whole patient.

One is impressed by the similarity of the various world religions as far

as their basic concepts are concerned. Love of man and the practice of the Golden Rule are in the core of all major religions.

If we are prejudiced, narrow-minded, and unlearned about the beliefs of other religions, let us read what is stated under Hinduism. "Hindu philosophers have been the greatest promoters of syncretism—the idea that the great religions should drop their differences and merge on the basis of common belief. The prominent religious reformer, Shri Ramakrishna, taught that all religions are true and are simply different paths to the same goal. This Indian passion for a universal tolerance, in contrast to the western concept that only its particular faith is the correct one, appears to be the chief barrier between western and eastern sociologists as well as politicians. The physician must appreciate this Hindu attitude." If this concept of live and let live could be universally accepted and practiced, world peace would be assured.

All in all, this little book with its helpful hints and useful knowledge should be in every physician's library and also in every hospital library, so that the dietitian does not serve pork when eggs are indicated.

ARNOLD S. ANDERSON, M.D.

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News Briefs . . .

North Dakota

THE FIRST DISTRICT MEDICAL SOCIETY held its April meeting at the Top of the Mart, Frederick-Martin Hotel, Moorhead, Minnesota. Dr. George Herrmann, professor of cardiology and medicine at the University of Texas, spoke on "Modern Concepts of Atherosclerosis and its Management." This is the annual lectureship which is sponsored by the Dakota Clinic, Fargo, in honor of its founders, Dr. Kent E. Darrow and Dr. William H. Long.

• • • •

DR. JOHN ANTHONY, a 1957 graduate of the University of Manitoba Faculty of Medicine, has established practice in Stanley and is associated with Dr. Alexander Diduch. Dr. Anthony practiced for a short time in Wishek and then went to Powers Lake where he replaced Dr. Robert Goodman while he was on vacation.

• • • •

DR. GEORGE V. MARTIN has taken over the practice of Dr. T. A. Osten in the Michigan Clinic. Dr. Osten left Michigan to join a clinic in Toledo, Ohio. A graduate of Georgetown University, Dr. Martin has taken post-graduate work in pathology and general surgery. He has practiced in Washington, D. C.; Norton, Virginia; and Wausau, Wisconsin. During World War II, Dr. Martin served five years with the Army and was discharged with the rank of lieutenant colonel.

• • • •

DR. ROBERT H. WHITTLESEY has joined the staff of the Great Plains Clinic in Minot. A graduate of Johns Hopkins University School of Medicine, Dr. Whittlesey interned at Henry Ford Hospital, Detroit. After two years in the Naval Air Corps, he returned to Henry Ford Hospital for training in surgery. Later, the United States Public Health Service awarded him a fellowship to study blood vessel function. For this year of study, he went to Western Reserve University and later completed his surgical training there and at Children's Memorial Hospital, Chicago. Since completing his training, Dr. Whittlesey has been instructor in surgery at Western Reserve Hospitals and has also maintained a private surgical practice in Cleveland.

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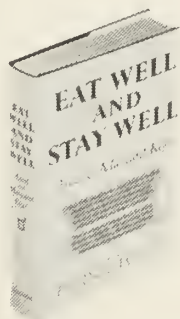
DR. MARTIN HOCHHAUSER began a year's leave of absence from the Garrison Clinic on May 1. He has accepted an appointment at the Research and Educational Hospitals at the Chicago Medical Center.

Minnesota

OPEN HOUSE was held recently at the new clinic in Stillwater. Examining rooms in the modern, one-story structure are located around a central core of staff facilities, which include a laboratory, sterile supply room, nurses station, and therapy room. The waiting room overlooks the entrance and children's play area. The joint conference room permits an exchange of ideas and information among the staff. Color plays an important part in the interior design. Pastel and neutral shades are used in the examining rooms, while brighter colors are employed

(Continued on page 24A)

*The diet and recipe book
that has become a
national best seller!*



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EAT WELL AND STAY WELL

Foreword by Paul Dudley White, M.D.

WRITTEN in response to thousands of requests from physicians and laymen for a book that makes clear, once and for all, the vital relationship between good health and good eating, this new best seller has gained widespread popularity with the public and is being recommended strongly by physicians. Clear, comprehensive answers to questions on heart disease, "fad" diets, food preparation with minimal fats, and special diets for athletes and invalids—plus a full week of delicious and nutritious menus and recipes for every season of the year—make the volume especially valuable. In the words of Dr. White, "this volume is unique in that it has been compiled by an authority of many years' experience in the physiology of nutrition and by his wife, an expert in the culinary arts as well as in the field of biochemistry . . . It is a satisfaction and a pleasure to recommend this useful and interesting book."

\$3.95 at all booksellers, or direct from
Doubleday & Co., Inc., Dept. 9-JL-6
Garden City, New York

*author of "Notes From a Medical Journey"

NEWS BRIEFS

(Continued from page 23A)

in the corridors and in the waiting room. Physicians on the staff are Drs. J. W. Stuhr, J. E. Jensen, M. F. Jurgens, and G. Mitchell.

• • • •

DR. A. B. BAKER, head of the Department of Neurology at the University of Minnesota, was recently presented with a citation for "significant contributions to opportunities for normal living for people with epilepsy." The presentation was made at the annual meeting of the National Epilepsy League in Washington.

• • • •

DR. HIRAM E. ESSEX, emeritus member of the Mayo Clinic staff, has been named director of undergraduate research for the new experimental program in biology at St. Mary's College, Winona. Objective of the program is to determine whether providing superior undergraduate students with experience in research under competent faculty members can make an important contribution to science education. The program will begin in September and continue for about a year. About 15 juniors and seniors will participate. Dr. Essex retired from the Mayo Clinic and Mayo Foundation a year ago after serving thirty years. He was internationally known for research in physiology and experimental medicine.

• • • •

DR. JOHN E. FABER, of the Mayo Clinic, was certified as chairman of the Minnesota section of the American College of Obstetricians and Gynecologists at the group's

annual meeting in Atlantic City. Dr. Faber is head of a Section of Obstetrics at the clinic and instructor in obstetrics and gynecology in the Mayo Foundation.

• • • •

DR. COLLIN S. MACCARTY, a member of the Section of Neurologic Surgery at the Mayo Clinic and associate professor of neurologic surgery in the Mayo Foundation, was elected president of the Neurosurgical Society of America at the group's annual meeting in Hot Springs, Virginia.

• • • •

DR. WESLEY W. SPINK, professor of medicine at the University of Minnesota, was elected first vice president of the American College of Physicians at the group's annual meeting in Chicago. A governor in the college, representing Minnesota for the last nine years, Dr. Spink was also elected to the college's board of regents.

• • • •

DR. C. GORDON WATSON has been elected chief of staff of Fairview Hospital, Minneapolis. He succeeds Dr. Harry B. Hall. Other medical officers are: Dr. Lester W. Carlander, Jr., chief-elect; Dr. George Martin, secretary; Dr. Gordon W. Strom, treasurer; Dr. M. S. Belzer, Dr. Richard C. Gaard, Dr. G. M. Kelby, Dr. R. W. Konecky, Dr. Glenn Petersen, and Dr. Ralph Silas, executive committee members.

• • • •

DR. STANLEY B. CROSBIE, former chief of the medical service at Veterans Administration Hospital, Grand

(Continued on page 26A)

Presenting . . .

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Method

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2. 0.9 ml. Sulfuric Acid.

Mix laterally and COOL to 90°-110° F.

3. 0.2 ml. SERUM or PLASMA.

Mix laterally immediately following serum addition.

Allow 3 minutes for complete reaction.

Transfer to absorption cell and within 5 minutes.

Read at 550-650 mμ; 640 preferred. Use reagent for blank.

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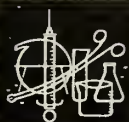
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NEWS BRIEFS

(Continued from page 24A)

Junction, Colorado, has been appointed director of professional services at Veterans Administration Hospital, Minneapolis. Dr. Crosbie will coordinate the University of Minnesota College of Medical Sciences with the hospital's resident physician and dental training program.

• • • •

SEVEN NEW CONSULTANTS who have recently been named to the staff of the Mayo Clinic are: Dr. Thomas L. Bran-
nick, psychiatry; Dr. Arnold L. Brown, Jr., and Dr. Chris A. Pascuzzi, pathology; Dr. George E. Plum, radiology; Dr. Alexander Schirger and Dr. John W. Worthington, Jr., medicine; and Dr. Robert J. Spencer, proctology.

• • • •

DR. WALTER A. FANSLER, emeritus clinical professor of surgery at the University of Minnesota, will present a paper in a symposium on Cancer of the Rectum and Colon at a joint meeting of the Section of Proctology of the Royal Society of Medicine and the American Proctology Society to be held in London, June 29 to July 2.

• • • •

DR. HAMILTON MONTGOMERY, senior consultant in the Section of Dermatology at the Mayo Clinic and a staff member since 1929, assumed early emeritus status April 1. An internationally recognized authority on the microscopic aspects of diseases of the skin, Dr. Montgomery is devoting full-time attention to the preparation of a volume on dermatohistopathology, a project which has

been under way for several years. He is also continuing to work on a revision of a 1,500-page textbook on "Diseases of the Skin." Dr. Montgomery is still available for consultation with active members of the Section of Dermatology.

• • • •

DR. FRANK F. NELSON, radiologist, is expected to join Dr. J. W. Burnett in practice in New Ulm in July. A graduate of the University of Wisconsin Medical School, Dr. Nelson interned at St. Francis Hospital, La Crosse, Wisconsin. He received special training in radiology at St. Vincent's Hospital and New York Hospital, both in New York City.

• • • •

DR. RAYMOND D. PRUITT, consultant in internal medicine at the Mayo Clinic and professor of medicine in the Mayo Foundation, will leave Rochester July 1 to become chairman of the Department of Medicine at Baylor University College of Medicine, Houston, Texas. The appointment includes assignment as physician-in-chief to the Jefferson Davis Hospital and chief consultant in medicine to Veterans Administration Hospital, Houston.

• • • •

DR. ALAN M. MCKAIG, resident physician with the Red Lake Falls Clinic since 1950, plans to leave in June for Chenango Bridge, New York, where he will join a clinic and specialize in obstetrics. Prior to joining the Red Lake Falls Clinic, Dr. McKaig practiced for several years in Alabama.

(Continued on page 29A)



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*From plaque honoring Thomas B. Janney, benefactor of hospital

The Abbott Hospital

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MINNEAPOLIS

NEWS BRIEFS

(Continued from page 26A)

South Dakota

DR. ANTHONY PETRES has begun practice in Salem in the same location formerly occupied by his predecessor, Dr. A. H. Hoyer, who retired last fall after more than fifty years of service to the community. Dr. Petres graduated from medical school in Budapest, Hungary, and took postgraduate work at Johns Hopkins University School of Medicine. He is a staff member of McKennan and Sioux Valley Hospitals in Sioux Falls.

• • • •

DR. R. E. COLLINS, who has practiced in Montrose for the past six years, left June 1 for Denver, Colorado, where he will take a three-year residency in radiology.

• • • •

DR. H. E. DAVIDSON, who practiced in Lead for nearly twenty-four years, has signed a contract with the Nebraska Psychiatric Institute as a first year resident in neuropsychiatry. He will be located on the campus of the Medical and Hospital Center of the Creighton University School of Medicine, Omaha. Dr. Davidson was instrumental in planning the development of the Tri-County Health District to incorporate Lawrence, Butte, and Meade counties.

Deaths . . .

DR. BERT E. HEMPSTEAD, 75, a member of the Mayo Clinic staff from 1921 until his retirement in 1950, died

April 16. He had been in ill health for about eight years. Dr. Hempstead was widely known as a specialist in diseases of the ear, nose, and throat. He was a fellow of the American College of Surgeons and a member of the American Academy of Ophthalmology and Otolaryngology; American Laryngological, Rhinological, and Otolological Society; and the American Otolological Society.

• • • •

DR. CHARLES N. HENSEL, 77, prominent St. Paul physician, died April 6 of pneumonia. A specialist in internal medicine and cardiology, Dr. Hensel was a fellow of the American College of Physicians, a past president of the Minnesota Heart Association and the Minnesota Academy of Medicine, and a member of the International Allergy Society and International Internists Society.

• • • •

DR. CLIFFORD N. RUDIE, 59 a physician in St. Peter, Minnesota, died April 22. He was on the staff of the St. Peter State Hospital and a staff physician for the Santa Fe Railroad.

• • • •

DR. ARTHUR H. SANFORD, head of the Section of Clinical Pathology at the Mayo Clinic from 1911 to 1946, and emeritus professor of clinical pathology in the Mayo Foundation, died April 28 of coronary insufficiency. He was coauthor with the late Dr. James C. Todd of *Clinical Diagnosis by Laboratory Methods*, a standard text in the field. Dr. Sanford devised with Dr. Charles Sheard and Mr. Dana A. Rogers the first successful photoelectric colorimeter for the quantitative determination of hemoglobin and other chemical constituents of the blood.



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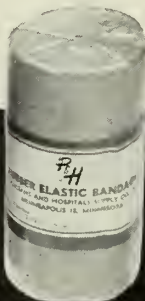
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PHYSICIANS' HEALTH PRACTICES REPORTED

"Too much work and not enough play" is an occupational dilemma which United States physicians should resolve if they want to keep up their own health standards. The average physician is so busy taking care of others that he doesn't have time to take care of himself. Prepared by Parke, Davis & Company, Detroit, Michigan, for the medical profession, a special survey on physicians' health practices and standards was conducted among more than 9,000 practicing physicians under 65 years of age engaged in private practice in this country. The United States physician undertakes a far heavier work load than the average person. Half of the physicians in this study reported a work week of fifty hours or longer—at least 20 per cent more than the accepted norm of forty hours. In fact, 13 per cent work sixty to sixty-four hours a week, and 6 per cent work eighty hours or more!

Close to 60 per cent of the physicians in the study stated that they spend less than ten hours a week on recreation. Even the physician with a hobby has virtually no opportunity to pursue it. For instance, of the 37 per cent who mentioned hobbies, half stated that they spent only four hours a week or even less on their particular hobby. Vacations, too, tend to be inadequate. One out of 20 physicians reported they took no time off for vacations during the year, and more than 1 in 10 took only a week or less. Despite his crowded work schedule, the physician loses less time from work due to illness than the average man. Two-thirds of the doctors in the study reported no time lost from work last year. The remaining one-third reported an average time of 3.8 days lost due to illness as against 7.4 days of work loss by the average American man.

NEW FECAL SOFTENER

Ideal laxative therapy now has been made possible by the application of a new principle based on the double surfactancy of the new therapeutic chemical, calcium bis-(dioctyl sulfosuccinate), now being introduced by Lloyd Brothers, Inc., Cincinnati, Ohio. No longer is a "cathartic flush" needed to expel a hardened, resistant fecal mass. Instead, when this superior fecal softener has rendered the mass malleable and mobile, a gentle peristaltic stimulant can completely correct bowel dysfunction. Doxidan is a true synergistic combination of calcium bis-(dioctyl sulfosuccinate), a new superior surfactant fecal softener, and danthron, a mild peristaltic stimulant, which acts solely in the lower bowel. This new dimension in treatment results in soft, normal stools gently stimulated to evacuation.

Danthron has been well established as a gentle-acting anthraquinone derivative, which consistently produces gentle laxation with markedly less cramping and griping than ordinary laxatives. Calcium bis-(dioctyl sulfosuccinate) produces approximately double the surfactant action of the older fecal softeners. Doxidan is available in soft gelatin capsules containing 50 mg. of 1,8-dihydroxyanthraquinone and 60 mg. of calcium bis-(dioctyl sulfosuccinate) and is supplied in bottles of 30 and 100. The usual adult dose is 1 or 2 capsules daily for a period to be determined by the physician. For children 6 to 12 years of age, the usual dose is 1 capsule at bedtime for several days or until bowel movements become normal.

COMING in *August* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- Raymond O. Brauer, M.D., of Houston, Texas, writes on "Observations on the Therapy of Leg Ulcers." The etiology, pathology, and treatment of these lesions are discussed. Conservative treatment is suggested for older persons or for those whose ulcer is relatively small and early in the degenerative process. When treated surgically, wide excision of the ulcer with delayed grafting is advised. The importance of post-operative care is emphasized.

- The changes that occur when a nerve is severed are listed by Lyle A. French, M.D., of the University of Minnesota, in his article "Peripheral Nerve Injuries," which will appear in the series on fractures. Treatment varies according to the type of nerve injury. Concussion of a peripheral nerve, contusion of a nerve, and laceration of a nerve trunk are among the types considered. Physiotherapy, consisting of passive motion, massage, and possible faradic electrical stimulation, is advised during the period of nerve regeneration after a nerve has been sutured.

- In the series on communicable diseases, Edward C. Maeder, M.D., of Minneapolis, discusses "Trichomonas Vaginitis and Trichomoniasis." According to the author, an increasing number of gynecologists are beginning to believe that trichomoniasis is a venereal disease and should be treated as such. Since recurrences are common, all foci of reinfection must be eradicated. The role of the man as carrier and frequently the cause of recurrence in the woman must be acknowledged and treated if treatment in the woman is to be effective.

- The lesions of erythema nodosum are manifestations of many apparently unrelated diseases. A few cases have been reported in which no other underlying disease has been found, which does not necessarily mean that another disease was not present. Selwyn Willig, M.D., of Minneapolis, reviews the literature on this subject in his article "Erythema Nodosum" and recommends directing treatment toward the underlying disease process. Salicylates are usually satisfactory in controlling the fever and discomfort caused by the skin lesions. Bed rest has been noted to aid in shortening the duration of the lesions.

Meetings and Announcements

SPORTS MEDICINE CONGRESS

A Sports Medicine Congress will be held August 27 to September 7 on the Chicago campus of Northwestern University in conjunction with the third Pan American Games. Featured will be experts in such fields as athletic training, care of injuries, diet, and cardiovascular effects of sports activity. For further information, write Dr. Van Dellen, Pan American Games, Inc., 310 S. Michigan Ave., Chicago 4.

RHINOLOGIC SOCIETY TO MEET

The fifth annual meeting of the American Rhinologic Society will be held in the Belmont Hotel, Chicago, October 10. It will be preceded by a surgical seminar in the Illinois Masonic Hospital, Chicago, October 7 through 9, which will open with a showing of scientific exhibits. On succeeding days, the program will consist of lectures, surgical demonstrations, clinical reports, and panels. For further information, write Dr. Robert M. Hansen, Secretary, 1735 N. Wheeler Ave., Portland 12, Oregon.

PUBLIC HEALTH MEETING

The annual meeting of the American Public Health Association and meetings of related organizations will be held in Atlantic City Convention Hall, October 19 to 23. Highlights will include presentation of the annual Albert Lasker Awards and the Sedgwick Memorial Medal, highest awards in public health. Plans also call for scientific and industrial exhibits as well as scientific sessions and workshops.

WORLD POSTGRADUATE TOUR

The fourth around-the-world postgraduate refresher clinic tour, sponsored by the International College of Surgeons, will depart by plane from San Francisco on October 10. Participants will attend meetings in Tokyo, October 18 to 19; Hong Kong, October 29 and 30; Bangkok, November 2; Tel Aviv, November 20; Istanbul, November 24; and Athens, November 27. For further information, write the Secretariat, International College of Surgeons, 1517 Lake Shore Drive, Chicago 10, or International Travel Service, Inc., 119 S. State St., Chicago 3.

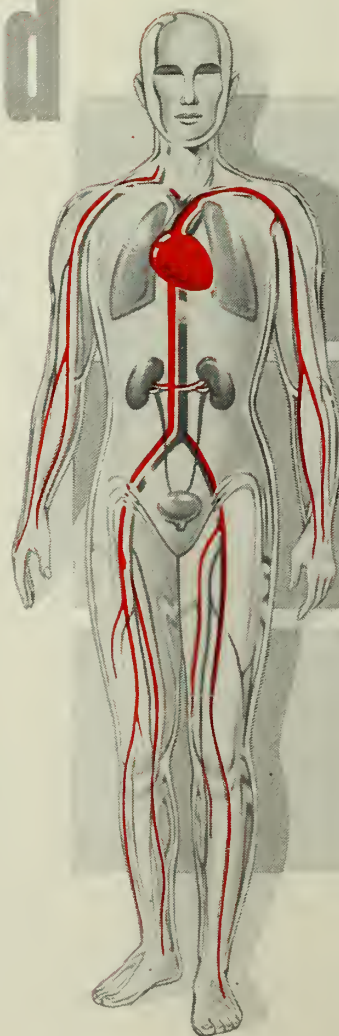
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Angiography

JOHN M. McKAIN, M.D.

Omaha, Nebraska

MOST ADVANCES in clinical medicine are effected through one of two channels. The first includes those advances which are made through the medium of better treatment methods. In the field of surgery, most of the credit for our gains in this area in the past three decades can be attributed to the surgical research laboratory. More specifically, they can be attributed to the dog surgery research units patterned after the old Hunterian Laboratory in Baltimore. The other channel of advance is concerned with the development and application of new diagnostic aids. This is a mammoth field and one which places a considerable burden upon physicians striving to maintain medical excellence. With the introduction of each new diagnostic aid, an obligation immediately devolves upon the shoulders of practicing doctors. On the one hand, it is not fair to withhold from his patient new help in diagnosis. On the other hand, the practitioner cannot know for a period of time the specific indications or dangers associated with new procedures. In addition, he cannot know in a short time the reliability of the information obtained or how to interpret his results accurately.

Therefore, any new diagnostic aid must be periodically placed upon the scales of medical justice. The medical gain accrued for the patient, doctor, and hospital must be balanced against the loss in each of these parameters.

JOHN M. MCKAIN is assistant professor of surgery at The Creighton University School of Medicine, Omaha.

With angiography, I fear that the scales are now tipped in favor of medical loss.

Angiography has had a short and glorious history. It has progressed a long way from the original demonstrations of the Portuguese pioneers Moniz and Dos Santos. One must search diligently to find a blood vessel which has remained unassailed by the probing physician. Angiography lends itself well to graphic portrayal. It therefore constitutes a satisfying experience for all concerned if complications do not arise. It is this pleasure that has tipped the scales of justice.

Historically, the modern era of vascular visualization in living persons dates from 1927. However, it is interesting to recall that within two years after the discovery of the roentgen ray, angiography was performed by arterial perfusion of amputated legs. Moniz¹ first attempted this x-ray study in human beings with cerebral angiography. Prior to this time, pneumography, which had been introduced by Dandy² in 1918, was the sheet anchor of the neurosurgeon. We have since seen a steady growth in the popularity of the intravascular approach to the diagnosis of central nervous system lesions. The vertebral arteries have been encompassed. New evidence indicating the prominent roll of the carotid arteries in cerebral thrombosis is appearing.³ In short, cerebral arteriography seems destined to replace pneumography in the localization of brain tumors as well as arteriovenous malformations. It is also being used more and more for the diagnosis of subacute or chronic subdural hematoma. The complications of the procedure



Fig. 1. Operative angiogram visualizing a false aneurysm of the external carotid artery at the region of the lingual artery. This presented as a pulsatile mass displacing the left tonsillar pillar.

are well documented. The major dangers are hemiplegia, intracranial bleeding, and amaurosis. These must be weighed against the advantages and disadvantages of pneumography—specifically, cerebral edema. It seems likely that arteriography has maintained proper perspective in the



Fig. 2. Aortogram revealing complete obstruction of left iliac artery. Observe the vivid visualization of jejunal mucosa, the superior mesenteric artery, and the right renal artery.

diagnostic arena of neurosurgery. Figure 1 represents visualization of a false aneurysm of the external carotid artery which was a sequela of a stab wound.

AORTOGRAPHY

Dos Santos,⁴ a urologist, introduced translumbar aortography in 1929 by recording his experience in 300 cases. This procedure, coupled with the dramatic demonstration of cardiac catheterization by another urologist, Forssmann,⁵ has enabled us to make great strides in cardiovascular surgery. We have learned much in the fields of physiology, cardiology, and surgery because of these diagnostic aids. It is my feeling, however, that we now overuse aortography. In most instances of embolism, obstructive disease of the terminal aorta, and aneurysm of the abdominal aorta such a procedure is no longer warranted. Needed information can be obtained by other less noxious methods. Again, we see medicine abandoning the clinical examination of the patient in the rush to the laboratory and x-ray department.

Embolism and traumatic arteriovenous fistulas can be localized quite accurately by history and physical examination. The percentage of aneurysms which lie below the renals is quite high. In obstructive processes, the most valuable information is not obtained by aortography. It

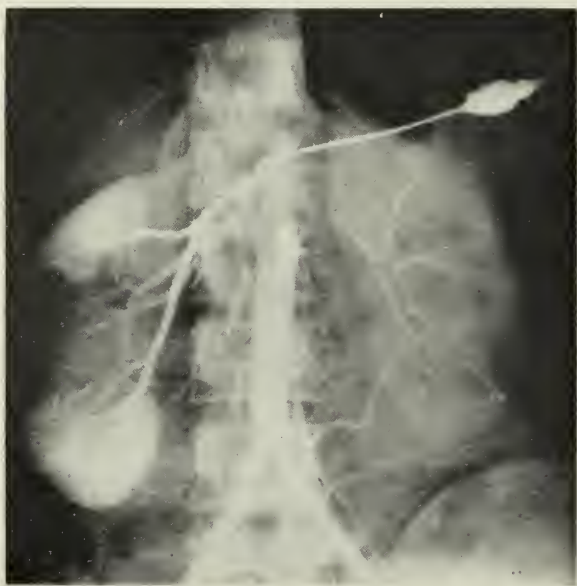


Fig. 3. Aortogram showing anomalous renal arterial supply. Note positioning of needle close to renal artery take-off. (Courtesy of BOHDAN J. KOSZEWSKI, M.D.)



Fig. 4. Femoral arteriogram vividly displaying multiple arteriovenous communications.

is seldom, indeed, that the outflow tract is well visualized by this maneuver. In almost all instances, the bounding pulse of the aorta or iliacs proximal to the segmental obstruction can be felt. Figure 2 represents an aortogram performed on a patient 53 years of age. Both physical examination and the aortogram revealed an obstructed iliac artery. It was still necessary to perform a femoral arteriogram prior to bypass surgery in order to be more assured of an adequate outflow tract. This aortogram, with its vivid visualization of the mucosa of the ileum, illustrates one of the dangers of aortography.

The urologic indications for aortography remain strong, although urologists are less enthusiastic each year. Figure 3 is a nephrogram visualizing an anomalous arterial supply to the kidney. This maneuver is particularly helpful in demonstrating unilateral renal artery disease and small tumors. It also aids in the differential diagnosis between cyst and tumor.



Fig. 5. Splenoportography revealing a normal portal vein with reflux via coronary vein to gastric and esophageal varices. Note size of splenic vein.

Complications of aortography are severe. Death has been reported. Ischemic necrosis of various organs is often seen secondary to thrombosis. Pancreatitis and renal shutdown may appear. Paraplegia has resulted in some astronomical lawsuits. In my short career, I have seen death, paraplegia, and ischemic necrosis of the left colon. The true incidence of these complications will probably never be known.

ANGIOCARDIOGRAPHY

Angiocardiography is another graphic altar upon which we have cast ourselves. Although it is sometimes most helpful, it is much more frequently confusing. It is seldom called for and has been outmoded by the electronic miracle of image amplification, coupled with high speed motion picture records, taken at the time of cardiac catheterization. This is a much safer procedure in terms of radiation and dye. It is much more rewarding to the surgeon faced with the problem of repair.

ARTERIOGRAPHY

Distal arteriography is a much safer procedure with which to gratify one's artistic whims. A 23-year-old Indian male had been subjected to multiple treatments of his varicose veins as his leg continued to grow longer. A percutaneous

femoral arteriogram demonstrates multiple congenital arteriovenous fistulas (figure 4). He proved to have most of the interesting physiologic and clinical changes associated with this process. Obstructive arterial disease of the femoral artery is the most common indication for this procedure, of course. Arteriography helps immeasurably in deciding whether to operate as well as in deciding which operation is to be performed.

VENOGRAPHY

On the venous side of the ledger complications are less severe. We have learned a great deal from functional venography.^{6,7} In fact, we have learned enough to obviate the need for such venography in all but a very few, selected cases. Pictorial displays of a superior vena caval obstruction make nice slides, but seldom do they change the treatment or the prognosis. This procedure only subjects the patient to unnecessary risk. Hospital facilities are tied up, and physician time is expended in the process of obtaining these x-ray films.

SPLENOPORTOGRAPHY

Percutaneous splenic puncture, coupled with splenoportography and pressure measurement, is one of the few diagnostic procedures which is not used enough. It is indispensable in most instances of portal hypertension. Figure 5 is of a 13-year-old Chippewa Indian boy with hematemesis and pancytopenia. After splenoportography changed our diagnosis, a splenorenal shunt was performed. His portal pressure dropped from 530 mm. of water to normal. He subsequently had a nice hematologic response, and evidence of liver disease is fading. It has been shown that in such cases the risk involved in portography is slight and the information gained is often most helpful.⁸ The indications for portography are now being broadened to include

expansive processes in and about the liver. By this procedure, we recently were able to diagnose liver abscess in a patient with a normal spleen and a fever of undetermined etiology.⁹

There are many unusual aspects of angiography which have not been mentioned. Retrograde coronary angiography is becoming quite the vogue. Left ventricular puncture is almost a necessity for proper workup and visualization of aortic valvular lesions. Angiopneumography, the visualization of the arterial tree and/or heart by injection of gas, is now an accepted procedure. Some choose to demonstrate bladder tumors by arteriography and testicular tumors by cavography. Hip fractures, prostates, and adrenals are being visualized. In short, no area of the body has been spared.

It would seem appropriate for every practicing physician to occasionally stop to reassess the medical gains and medical losses of every diagnostic aid. First, he should do this from the standpoint of the patient. Next, he should consider the already overtaxed hospital facilities and give note to the rising cost of medical care today.

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The Ethics of the Physician

LOUIS A. BUIE, M.D.

Rochester, Minnesota

AMONG THE OLDEST systems of ethics is that of the medical profession, and the American Medical Association has been more than conscientious in accepting and preserving the responsibilities implied in such a system. Through the years the association has endeavored to engender and to enhance the proper behavior of all its members. Even a casual review of the association's *Principles of Ethics* by an impartial observer must inevitably convince him that no other body of men, whatever their calling, is guided by higher ethical standards.

The National Medical Association, which was the forerunner of the American Medical Association, appointed a committee at its first meeting in New York in 1846 to prepare a code of ethics. The proposed code was offered at a meeting which was held in Philadelphia in 1847, and it was patterned after the principles of Thomas Percival, who had published 92 rules for the guidance of physicians of England in 1803. Percival's concept of ethics dealt chiefly with the relationship of physicians with each other, and the rules which he set down can account for the volume and some of the content of the version of the *Principles of Ethics* which served as a guide to members of the American Medical Association for more than a hundred years.

Until the revision was adopted in June of 1957, the accretions of many years had encumbered the *Principles of Ethics* with verbiage, ambiguities, pleonasms, and qualifying constructions of dubious value, which, in themselves, engendered confusion and made straightforward interpretation most difficult. Hence, it became quite clear that the text should be altered to deal with broad, basic principles which could serve as a ready reference for the busy practitioner and which would reflect the spirit of the modern age. Physicians had become accustomed

to a lengthy document which never had encompassed fewer than 40 sections and which, at one time (1903), contained as many as 53 sections. Just before the revised edition was adopted, the *Principles* were comprised of a preamble and 47 sections amounting to more than 8,000 words. Some physicians, in fact, had never seen the *Principles* and others had frankly despaired of ever getting through the massive text.

In June of 1952, the House of Delegates of the American Medical Association assigned to its Council on Constitution and Bylaws the task of revising the *Principles*. Accordingly, in December of 1955, an exhaustive analysis and tentative proposals were prepared. In this report, many of the complexities of the undertaking were revealed. For example, when an attempt was made to distinguish a simple point of etiquette from a much graver question of ethics, it became readily apparent that a substantial portion of the text actually dealt with matters in which morals, manners, and even economics were intermingled. Some sections which were intended to deal with matters of courtesy might well have been construed to involve problems of morality. Some questions of transcendent significance were enmeshed with others of such ephemeral value that they did not properly belong in the text. At all events, it became clear beyond doubt that a broad twilight zone existed in which the fundamental concepts of ethics were entangled with the simplest propositions of etiquette and in which there was much overlapping and consequent confusion.

A condensed version of the new plan was prepared and presented to the House of Delegates in June of 1956. In view of the fact that few members of the medical profession had been afforded an opportunity to study the proposal, the Council requested that the new version be publicized and that action by the House of Delegates be deferred until the next annual meeting.

The brevity of this new version of the *Principles* attracted immediate attention and occasioned some doubt and criticism. In its report, the Council on Constitution and Bylaws emphasized the fact that there is nothing new or origi-

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Paper presented before the Association of Fellows of the Mayo Foundation, Rochester, January 30, 1959.

nal about the quality of brevity. As examples, attention was called to the Constitution of the United States and, even more significant, the Ten Commandments. As further proof, the members of the House of Delegates were reminded of the oath of Hippocrates. This oath is the apotheosis of compact expression, and it established the pattern for the subsequent development of all medical ethics. In some 300 words, it outlines many of the basic principles on which most ethical codes have been built during the past two thousand, two hundred years. From the standpoint of integrity, no one has improved on the principles of this oath, but from the point of view of practical application, work has never ceased on the problem of adjusting them to the requirements of the contemporary scene. The new version of the *Principles*, which was ratified at the annual session of the American Medical Association in June 1957, consists of a brief preamble and 10 sections, which, in about 500 words, succinctly express the fundamental ethical concepts embodied in the cumbersome document which had served for one hundred and ten years. Much of the prolixity and ambiguity which in the past had obstructed ready explanation, practical codification, and particular selection of basic concepts have been eliminated, yet the essence of every basic principle has been preserved. No fundamental concept of the original *Principles* has been omitted. The new version is intended to provide the physician with a permanent and readily accessible guide to ethical conduct.

THE JUDICIAL COUNCIL

To ensure that the *Principles* will be interpreted correctly and applied equitably, an appropriate deliberative body is necessary. The value of this arrangement is attested by courts of law which perform a similar function in forensic matters and by clergymen who interpret theologic principles for their congregations. The judicial body of the American Medical Association is the Judicial Council. It is expected that the *Principles* will be supplemented by opinions and interpretations of this council, most of which are based on past decisions and pronouncements which have been published for many years and which are now included in a special issue of the *Journal of the American Medical Association*,¹ a copy of which every physician should have. No system of ethics could abrogate this paramount function, and men of wisdom would not have it otherwise.

Thus far, I have had nothing to say about the specific principles. Let me begin by saying that

these brief statements are intended to serve the physician as guides to ethical conduct, and that they are not immutable laws to govern him in the course of his professional activities. The principles are written so that interpretations can be made by the Judicial Council to adapt them to particular factual situations.

THE PUBLIC DOMAIN

The young physician quickly learns that in the practical affairs of life, ethics and economics often overlap. His idealism leads him to place ethics first, but economic needs often are responsible for a sharp conflict of purposes. Today, more than ever before, medicine is in the public domain. We see medicine as a leading motif on television; we hear much about medicine on the radio; and we read about it in the daily press in accounts by writers who specialize in the field. Much of this is good, but a certain amount is stimulated by aggressive, irresponsible individuals who would destroy the very system upon which the free practice of medicine is based. Thus, it is more important than ever for the physician to adhere to his ideals, and his relationship with his patients should be his first consideration.

SOME MAJOR QUESTIONS

A few important points in the *Principles* may seem to lead to confusion, and I should like to consider some of them briefly. Some of these points are free choice of physician, fee-splitting, rebates, advertising and solicitation, and purveyal of medical services.

Free choice of physician. This is an expression used to reflect both an economic and an ethical principle. The phrase simply means that the patient has the right to choose his physician, but application of this right is by no means absolute. For example, the physician also has the right, except in emergencies, to choose his patient. However, arbitrary or economic limitations on the patient's inherent right to choose his physician are detrimental to the patient's welfare and should be kept at a minimum.

Many industries choose certain physicians to care for their employees. Often, this practice is necessary because of the demands of employees for so-called fringe benefits. A good quality of medical care is not always provided by this arrangement, but the deficiency is frequently difficult to prove because of the attitude of the patient. Sometimes he simply does not care, or he is impressed by the fact that the medical attention he is receiving appears to be inexpensive. Now, members of the medical profession

do not believe that their professional services can be bought, sold, packaged, and delivered as a commodity in trade. To them, "free choice of physician" is a fundamental issue, as it should be to every citizen. By some public figures, this principle is said to be an ancient shibboleth to protect selfish ends, and some commercially minded interests ridicule the concept. Yet experience has shown that the quality of medical care deteriorates when a third party chooses the patient's physician and pays the bill. This arrangement disrupts the intimate personal relationship which is so important to the art and science of medicine and destroys the very source of the patient's confidence in his physician.

The *Principles of Medical Ethics* require that the physician must have "full respect for the dignity of man." He should "merit the confidence of [his] patients" and must not "dispose of his professional services under terms or conditions which tend to interfere with or impair the free and complete exercise of medical judgment and skill or tend to cause deterioration of the quality of medical care." Free choice of physician is necessary if these *Principles* are to be observed.

Fee-splitting. The ethical objection to fee-splitting is based on the fundamental principle that whatever weakens the confidential relationship between patient and physician is likely to make diagnosis more difficult, treatment less effective, and recovery less prompt. No patient would choose to be the unwitting victim of secret negotiations when his health and even his life may be in the balance. Frank and open relationship with the patient are destroyed when the specialist secretly rebates a portion of his fee to the referring physician.

If I have a patient who requires a surgical operation which I cannot perform, it is my duty to refer him to a surgeon of his choice or, if he has no choice, then I am dutybound to select the surgeon who I believe can perform the operation most capably. It is unethical for me to accept a referral fee. It is unethical for me to arrange for hospitalization, to schedule the operation, and to call on another surgeon to perform the operation without the patient's knowledge that the operation is being done by someone other than myself. If, in addition, I send a bill for the entire service, I am guilty of what is known as "ghost surgery." This type of deception is always accompanied by payment of a fee to the "ghost surgeon." It is also unethical to "stand in" with the surgeon in order to assure a fee for assisting.

On the other hand, if I participate in the care of a patient, it is perfectly proper for me to

collect a fee, but the fee must not be paid to me by a colleague to whom I have referred the patient. The most significant part of the entire arrangement is the method of billing. I must render a separate bill to the patient, and it must be paid directly to me.

There are many ways of splitting fees. For example, a druggist might offer to pay my office rent if I specifically refer all my prescriptions to his drugstore. A group of physicians or a clinic with a building may rent space to a druggist on a sliding scale, the rent depending upon the profit made by the druggist on the prescriptions from the group. Or, the druggist may pay a certain percentage of the net profit to the group which owns the building. In this case, a fixed rental charge is the only ethical arrangement. A firm which grinds lenses and makes glasses may give a rebate to an ophthalmologist who prescribes the glasses. In like manner, the orthopedist who prescribes braces, corsets, artificial limbs, crutches, and the like may receive rebates from the appliance manufacturer. All these things are unethical because they tempt the physician to send his patients to the company which is most liberal with its insidious remuneration of the referring physician, not to the source of the best service.

Advertising. The question of advertising presents another problem. However, our attitude in this regard differs greatly from what it used to be. That is, there was a time when an ethical physician felt that he had to avoid the questions of a newspaper reporter. Today, it is recognized that the public is entitled to know about advances made by the medical profession and that the physician is the one best qualified to appraise these advances. Advertising and solicitation are so inseparably a part of modern economic life, however, that continuous vigilance is required to guard against the intrusion of these dynamic forces into the field of medicine. Solicitation of patients is proscribed by the *Principles of Ethics*. Physicians generally recognize that in an age of scientific wonders there is a constantly increasing body of news and information concerning disease which is helpful to the public. Yet, it is also true that exploitation of such news for profit may harm the public. Everyone knows how sensational publicity of cures for cancer, tuberculosis, and other diseases has resulted in unnecessary suffering and false hopes of relief. This, to any reasonable man, is cruel and reprehensible.

The ubiquity of radio and television broadcasting has brought with it new advertising problems. Quacks, patent medicines, and all kinds of cures thrust themselves into millions of

homes. There is no way to measure the injury to public health that has resulted from selling such medical services without appropriate evaluation and supervision.

Certainly the public should be informed about preventive medicine and public hygiene. The public should know the names of physicians, their type of practice, the location of their offices, their office hours, and the like, and physicians may furnish this kind of information through acceptable news media without fear of criticism. Telephone listings, office signs, professional cards, and dignified announcements all are acceptable means of making factual information available to the public. But, the particular use of any ethical advertising medium to solicit patients is unethical.

Purveyal of medical service. The practice of medicine by corporations is becoming more of a problem as time goes on. The Health Insurance Plan of New York, the Kaiser Permanente Organization on the West Coast, the United Mine Workers and other labor organizations, and the so-called "co-ops" are but a few of the groups that sell the services of physicians, pay their salaries, and collect their fees. We believe that such practices are detrimental to the best interests of the patient. When medical service is made impersonal, when the humanities of medicine are removed, when the coldness and automation of the machine are substituted for the humane interest and intimate counsel inherent in individual service, and when the professional and scientific independence of the individual physician is sacrificed, the quality of medical service and with it the health of those served will decline. Any attempt to make the conquest of disease subordinate to economic considerations violates the fundamental principles of medical ethics and is degenerating to the individual as a physician.

COMMENT

Some critics have said that the *Principles* will influence and be read only by ethical physicians. Some ask how the principles will be enforced. Who will expose the culprit? They say that col-

leagues will criticize each other among themselves but "just try to get someone to expose the offender." This is partially true, but are we going to abandon the Ten Commandments because there are agnostics and criminals who have never read them?

In this entire scheme of medical ethics, the officials and members of the county medical society have a heavy responsibility. Whenever the ethical conduct of a physician is questioned, not only is his personal reputation at stake, but the dignity of the medical profession is challenged. The serious nature of a charge of unethical conduct demands judicious management and adequate appraisal. Mature, objective, and discreet preliminary investigation is imperative. Often, this will disclose the existence of a simple misunderstanding which may reveal unfamiliarity with local customs and practices and which may result in voluntary corrective action without adverse reflection on the physician or the profession. The principle of local autonomy must be paramount, and facts must be determined at the local level. We must rely on county medical societies to perform this function. When it is demonstrated that ethical principles have been violated, then charges should be prosecuted. It should be remembered that it is the responsibility of the accuser to determine that an unethical act has been committed, and it is always advisable to consult the Judicial Council before hastily considered or precipitous action is taken.

Finally, it is important to understand that medical ethics are not distinct or separate from ethics generally. They simply emphasize those general principles which are of particular concern to the medical profession. The ethical physician will observe all ethical principles because he realizes that they cannot be enforced by penal reprisals but must be binding in conscience.

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Review of the Orthopedic Literature for 1957

NORMAN W. HOOVER, M.D., and C. ROGER SULLIVAN, M.D.

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THE MEDICAL WRITER would do well to consider Johnson's observation to Boswell: "I wonder, however, that so many people have written who might have let it alone." An exhaustive survey of the orthopedic literature for 1957 is beyond the scope of this paper. Even so, in the preparation of this review, more than 500 papers were examined from which material was selected on the basis of general interest or innovation of concept or fact.

ANATOMIC ASPECTS

Trueta's¹ description of the vascular anatomy of the femoral head during growth is classic. His 1957 paper supplements his previous report in 1953 of the vascular anatomy of the adult femoral head. In the 1953 paper, he demonstrated the separate epiphyseal and metaphyseal circulations. The metaphysis is supplied by superior and inferior arteries, both from the medial femoral circumflex, the greater contribution being from the inferior branch. The epiphysis is supplied by a lateral branch from the medial femoral circumflex and a medial branch from the obturator artery, entering through the ligamentum teres. The lateral branch contributes two-thirds to three-fourths of the epiphyseal circulation. Anastomoses occur across the epiphyseal plate scar between these two systems in the adult person.

In his recent paper, Trueta¹ has shown that there is a changing pattern during development. Prior to 3 months of age, the inferior metaphyseal artery penetrates the epiphyseal plate and ascends into the cartilaginous head. The

lateral epiphyseal artery enters the cartilaginous head and penetrates horizontally, and the artery of the ligamentum teres penetrates the area of the fovea to supply a fourth to a third of the head. However, curiously, there is no intercommunication between the several systems at this age. From 4 months to 3 years, the vessels of the ligamentum teres disappear; the metaphyseal arteries decrease and no longer cross the epiphyseal plate; and the ossification center of the head is left with the lateral epiphyseal artery as its major or, more often, its sole source of supply. By the age of 4 or 5 years, the medial epiphyseal artery does not penetrate even the cartilage of the femoral head, and, at the time of complete organization of the bony epiphysis, that structure has a single blood supply. This situation obtains up to the age of 6 years, from which time until adolescence there is increasing contribution from the medial epiphyseal artery of the ligamentum teres. At this time, the growth plate is still an absolute barrier to the metaphyseal circulation, and the two systems retain their individual identities. Anastomotic connection between the epiphyseal and metaphyseal circulations occurs only when epiphyseal fusion is complete. During adolescence, there is a great increase in both the epiphyseal blood supply and the metaphyseal blood supply adjacent to the growth plate. The significance of these observations is speculative, but it seems likely that they bear directly upon the outcome of fractures of the neck of the femur in childhood, the pathogenesis of Legg-Perthes' disease, and the development of slipped femoral epiphyses.

AMPUTATIONS AND PROSTHESES

Emphasis frequently has been placed upon the "team" approach to rehabilitation of the person

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who has undergone amputation, with coordinated efforts of the surgeon, the prosthetist, the physiatrist, and the vocational counselor. There is general agreement that the previously favored "sites of election" of amputation are now invalid in view of recent developments in prosthetic apparatus. The rule in most situations is now to preserve as much of the member as possible. Compere and Thompson² wrote that any length in either the upper or lower extremity, except the distal two-thirds of the lower leg, can be fitted with a prosthesis. Lambert and Novotny³ advocated, however, preservation of a long tibial stump whenever possible, with amputation at the juncture of the gastrocnemius-soleus muscle and tendon, in view of recent work toward suspension of the prosthesis entirely below the knee. Harding and Langdale-Kellham⁴ concurred with these authors in their preference for disarticulation of the knee, since this procedure leaves a painless, end-weight bearing stump with maximal stability of the knee joint and permits rapid rehabilitation. It has the disadvantage of requiring outside knee hinges without mechanical control by friction for the adjustment of knee swing, but this disadvantage is being solved. When no indication exists for sectioning the femur at a higher level, disarticulation is strongly recommended, especially for old persons and children. These authors agree that after disarticulation of the wrist and elbow, the affected limb can be fitted with prostheses, but they hold that preserving the length of the member offers no functional advantage, and that amputation done proximal to these joints provides room for more satisfactory joint mechanisms.

Zanoli⁵ reiterated the advantages of the Krusen-Putti amputation-plasty of the forearm. The provision of pincers with a tactile sense offers real advantage to patients who have undergone bilateral amputation or to amputees who are blind. The stump can be fitted with a slightly modified standard prosthesis, or the "fingers" can be utilized as motors for a terminal device. Although it seems esthetically objectionable, this technic should be considered for such unusual conditions as those noted.

Brav and associates⁶ documented the Army's experience with kineplasty. They found fewer patients wearing the indicated devices than in a comparable group of conventionally fitted amputees, apparently because of lack of motivation and training rather than because of functional failure of the prosthesis or tunnel. The advantages of unilateral control independent of the position of the arm, absence of a shoulder har-

ness, better finger control, and provision for repetitive hand action without repositioning seem considerable. Moreover, for those who have undergone amputation above the elbow, kineplasty of the pectoral musculature provides another motor source and permits separation of elbow and hand function. In spite of these theoretic advantages, the poor acceptance on the part of those who might benefit from this procedure seems to relegate its use to patients with unusual limitations and needs.

BONE GRAFTING AND TISSUE TRANSPLANTATION

In spite of extensive writing on the subject during the past half-century, several basic questions regarding bone grafting seem to have been left incompletely answered. These include the viability of engrafted bone, the specific identity of the stimulus to osteogenesis in engrafted bone, the source of calcium in the healing and replacement of bone, the function of the periosteum and endosteum of the graft, the best method of preservation of bone, and, finally, the most suitable type of bone for grafting. Furthermore, if engrafted bone acts only as a framework for the formation of new bone, might some portion of the bone act as a deterrent to osteogenesis? In 1957, the reported conclusions were still conflicting. Dick and Graham⁷ reviewed the subject. They judged that the facts regarding survival of fresh autogenous grafts lie somewhere between the extreme opinions of Albee⁸ and Leriche and Policard.⁹ The cells near the periosteal and endosteal surfaces were seen to survive and to produce new bone, while those situated deeper did not. They found that autogenous grafts "took" most rapidly and that homografts required 50 per cent longer and heterografts twice as long. Cancellous bone was most rapidly replaced, whereas cortical bone was a poor stimulus to osteogenesis. This represents the current consensus. Haas¹⁰ of San Francisco reviewed his own earlier work and that of others during the past 2 decades, demonstrating the survival of fresh autogenous grafts with the inherent properties of osteogenesis when the grafts are placed within muscle. This capacity to proliferate was lost if the bone was boiled or if the periosteum and endosteum were removed. When either the periosteum or the endosteum was preserved, callus formed. He described his recent investigations of methods of preserving bone. This study was stimulated by Tucker¹¹ in 1953, who claimed that bone stored in homogenous plasma at 5° C. remained viable for twenty-eight months. Haas¹⁰ repeated this work, with variations, and found that bone stored at room tem-

perature for two days proliferated but that viability could not be preserved for more than fourteen days by any method. He believed that the best medium for the preservation of bone is homogenous citrated blood and that the optimal temperature is 5° C.

Cohen and associates¹² clarified somewhat the source of calcium in the healing of bone, using radioactive tracer studies in experimental grafting of homogenous bank bone. They admitted that their conclusions hold only for the conditions of their experiments and that calcium from autogenous grafts may be differently distributed. However, they concluded that calcium from the graft entered the circulation, was distributed in a manner similar to calcium from other sources, and did not contribute directly to the formation of callus. It was deduced from this and other evidence that the source of calcium was the circulating blood and not local deposits.

Stringa,¹³ in microradiographic and microphotographic studies of the vascularization of bone grafts, concluded that there is a striking correlation between the rate of vascular penetration of the bone implant and its ultimate "take." Creeping substitution occurred in autogenous bone by means of penetration by individual vessels, while, in homografts, the invasion was resisted and took place by frontal attack of granulation tissue only after osteoclasia. Whereas, in autogenous grafts, a normal vascular pattern was demonstrable in the invaded area within twenty days, fifty days or more were required for vascularization of homografts. In the case of autografts, suggestive evidence was found of recanalization of pre-existing vessels of the graft by advancing vessels from the bed. Enneking¹⁴ conducted a histologic investigation of bone transplants in immunologically prepared animals. His findings agreed with those of Stringa.¹³ Autogenous transplants remained viable, whereas homogenous transplants evoked an inflammatory response in most animals, although not invariably. The survival of homografts corresponded to a predictable incidence of antigenic compatibility of the strain, thus substantiating the antigen-antibody theory of rejection of grafts.

Dissonant opinions were represented in the papers of Maatz and Bauermeister¹⁵ and of Ray and Holloway.¹⁶ The former reviewed the history of maceration of bone, meaning the removal of all protein material from the intact graft, and they presented a method for accomplishing the process. Grafts consisting solely of inorganic material were thought to stimulate osteogenesis even more effectively than auto-

grafts. In contrast, Ray and Holloway¹⁶ advanced the interesting suggestion that bone matrix is the active stimulant to osteogenesis and that the inorganic substance acts as an impediment to replacement. In a neatly contrived experiment, they showed that when various grafts were implanted into bur holes in the craniums of rats, frozen homografts and inorganic salts evoked minimal growth of new bone and were resorbed at varying rates. Matrix grafts stimulated rapid vascularization and incorporation. The matrix did not remain as a viable transplant but acted rather as a stimulus to osteogenesis.

Holmstrand¹⁷ concluded that autogenous bone is replaced more rapidly than are other types and that the retarded replacement of certain forms of preserved and modified bone was the result of ultrastructural disorganization, particularly in respect to increase in the size of apatite crystal. He found that absorption substitution took place in this decreasing order: autogenous, homoplastic frozen, cooked, glycerolated, and, finally, macerated bone.

Vainio¹⁸ reiterated many of the foregoing questions. In view of the weight of evidence in favor of autogenous bone grafts, he suggested that the idea of the bone bank was founded upon unproved hypotheses in the haste of wartime. Although osteogenetic activity of the graft does not imply viability, results of his experiments support those of others that fresh autogenous grafts do, at least in part, remain viable and contribute to proliferation of bone. He reasoned that this is strong support for the use of autogenous grafts, particularly when taken with the experimental and clinical evidence of much more successful acceptance of such grafts by the host. Parenthetically, he also found evidence contradictory to the conclusions of Levander¹⁹ and others that the periosteum of the graft serves no purpose. His osteoperiosteal grafts developed attachment by intimate association of the periosteum with the surrounding connective tissue and periosteum of the host, whereas those free of periosteum remained free of attachment and were surrounded by granulation tissue which appeared to try to isolate the graft.

Ferrebee and Merrill,²⁰ in a provocative dissertation entitled "Spare Parts," supported the immunologic concept of rejection of homotransplants. Chimeras, which are animals with cells of more than one genotype, occur spontaneously in nature. This circumstance may occur in human beings when fetal circulation has crossed with that of the mother or a fraternal twin. If this occurs at a time before the reticuloendothelial system is sufficiently differentiated to re-

ject the foreign molecule, the host develops tolerance to it and thereafter retains tissue compatibility with the same donor. Such an immature reticuloendothelial response can be produced in adult persons by treatment with certain chemicals or roentgen rays. If, during such a period, the receptor is desensitized to donor antigens, it may be possible thereafter to effect viable homotransplantation from the same donor.

FRACTURES

Fractures of the forearm received attention in two significant papers. Hughston²¹ recalled the high incidence of nonunion, delayed union, and malunion in closed fractures of the radial shaft at the junction of the distal and middle-third portions unassociated with ulnar fracture. This has been called a "reverse Monteggia fracture" because of the similarity of deforming forces. Of 38 fractures conservatively treated, poor results occurred in 35, which were caused by angulation at the site of fracture and distal radio-ulnar subluxation. He advocated initial surgical treatment with double onlay grafts fixed with screws or a four-hole plate. Only when the fracture was seen late and the medullary canals had filled with callus was fixation with intramedullary nails found adequate.

Smith and Sage²² reported their experience with medullary fixation of fractures of the forearm. They found that the ulna is well suited to standard intramedullary fixation, whereas the radius, because of its curve and the changing diameter of its canal, is not. After treatment with this method, open and closed radial fractures yielded nonunion rates of 25 and 17 per cent, respectively. These were related to the inadequacy of radial fixation and to distraction of the ulnar fracture by straightening of the radial arch. In an addendum to their paper, they described a nail recently developed by Sage and reported favorable results in 20 patients in whom it had been used. This nail is triangular in cross section, is preformed to the curve of the radius, and is sufficiently malleable to permit correction of angulation after insertion.

Knight and Mayne²³ elaborated their experience with comminuted fractures and fracture-dislocations of the humeral head. Avascularity of the head was a common consequence, but it did not significantly impair the results. Normal function was lost in a high percentage of patients, but the patient was often better satisfied than the surgeon, since pain was not a significant sequel, and stability and strength usually were preserved. Comminution of the head or dislocation of the fragment of the head did not, to them,

indicate removal of the structure affected. They suggested that, in the presence of severe comminution, prosthetic replacement may well supplant simple resection of the humeral head or Jones's reconstruction.

Travis²⁴ reviewed the results of treatment of 510 patients who had sustained fractures of the tibial shaft in the army. He agreed with Urist²⁵ that most tibial fractures can be handled best by competently performed closed reduction and that injudicious surgical treatment is a common complicating factor. If operative treatment is imperative, long oblique and spiral fractures are best fixed with screws placed transversely to the long axis of the bone. Short oblique and transverse fractures, which were the most common types, are best treated by intramedullary-nail fixation. Severely comminuted and missile fractures should be managed by pin-in-plaster techniques. He found no indication for plate fixation and recorded only 35 per cent satisfactory results with that method, compared to 75 to 85 per cent good results with each of the other methods.

Hampton and Holt,²⁶ reporting the experience in St. Louis, where special favor for the Lottis nail might be anticipated, observed union in 117 of 126 patients treated with this device. These patients were unselected except in respect to applicability of the nailing technic. The majority of these nails were inserted after closed reduction without invading the site of fracture. This may explain the unusual success achieved in the series. The operative technic was described in detail, and the point was made that the tibia, because of its subcutaneous position, usually can be reduced by closed methods and maintained during the insertion of the nail. This method offered the advantages of earlier weightbearing in plaster, earlier removal of the plaster, a higher incidence of union if the site of fracture was not exposed, and the stimulating effect of the impacting force of weightbearing during healing.

The fracture which Kellogg Speed called the "unsolved fracture" seems still to be unsolved. Charnley and associates²⁷ described a new type of nail which incorporates a spring-loaded compression screw with a plate for fixation to the shaft. These authors believed, with Trueta,²⁸ that damage to the vascular supply of the femoral head at the time of injury is the primary cause of avascular necrosis. They agree with Dickson²⁹ that all subcapital fractures and fractures of the femoral head should be supported by fixation to the shaft, since the senile femoral neck is "nothing more than a hollow tube" and does not afford adequate support for a nail without fixation to the shaft. The compressing force

of the screw provides firm immobilization and prevents rotational motion. It was concluded that "this method probably eliminates non-union when the head is fully viable."

McElvenny³⁰ supported the opinion of Pauwels³¹ that insecure fixation with delayed union is the common cause of aseptic necrosis of the head of the femur. He has long maintained that secure fixation of transcervical fractures depends upon overreduction, with the inferior angle of the fragment of the head locked within the medullary cavity of the femoral neck. This is not possible in the presence of subcapital fractures, in which there is no projecting fragment of the femoral neck attached to the inferior border. Nonunion, he contends, occurs most frequently after failure of proper reduction of a transcervical fracture, or after attempts to pin a subcapital fracture without osteotomy. In either of these situations, delayed union is likely and can be recognized by the overproduction of callus, settling or shifting of the femoral head, shifting of the metal, condensation at the fracture line, increased density of the femoral head, or persistent pain. If this is recognized early and corrected, the vascular and functional integrity of the femoral head will be preserved. McElvenny strongly recommended displacement osteotomy as a reconstructive procedure in this circumstance, and asserted that the operation will produce a satisfactory hip, "regardless of the appearance of the femoral head or hip joint." He said that he has not observed as consistently good results obtained with prostheses as those which follow displacement osteotomy.

Intertrochanteric fractures of the femur, although more common than fractures of the femoral neck, attracted less attention in the literature. This undoubtedly comes about as a result of the usual prompt union of the intertrochanteric type of fracture. Two authors recorded exceptions to this rule, however. Clawson³² has classified fractures of this type into stable and unstable fractures, according to the integrity of the medial cortex of the femoral shaft and neck. In the presence of an unstable fracture, in which there is not firm cortical impingement medially or posteriorly, fixation depends upon the strength of the metal apparatus, and varus shift, dissolution of fixation, and eventual nonunion are common. With absorption at the site of fracture, the nail may hold the fragments apart. Clawson³² advocated, therefore, that stable fractures be treated by the usual form of internal fixation, but concluded that failure of the unstable fracture to unite is sufficiently common to recommend treatment in balanced traction.

Boyd and Lipinski,³³ in a report of 28 cases of nonunion of trochanteric fractures, substantiated the logic of the foregoing classification. They chose, however, not to accept the higher mortality rates applying to nonoperative treatment and suggested that intertrochanteric fractures be overreduced into extreme valgus, or that wedge osteotomy be done to accomplish this, and that such fractures be fixed in extreme valgus with a prebent Jewett nail. Their incidence of nonunion in this group was between 1 and 2 per cent.

Pipkin³⁴ has subclassified Stewart and Milford's³⁵ grade 4 fracture-dislocations of the hip on the basis of the relationship of the fracture of the femoral head to its weightbearing surface and the association of fracture of the acetabulum or femoral neck. Fractures caudad to the fovea were regarded as best treated by closed reduction, if possible, without strict attention to anatomic reposition if stability was secured. Open reduction became necessary if the fragment obstructed or prevented maintenance of reduction of the dislocation. Gross malposition of the fragment or severe comminution necessitated intervention. In fractures involving weightbearing areas of the femoral head, satisfactory results were obtained by open reduction and internal fixation when congruity of the joint surface could be effected. When this was impracticable, endoprosthesis was required. The most important contribution of this paper was the reiteration of the point elaborated by Stewart and Milford³⁵ that survival of the femoral head is related to the time of reduction of the dislocation and that although operative intervention for removal or realignment of fragments can await exhaustive medical evaluation, reduction of the dislocation cannot.

Brav³⁶ recorded the experience during the Korean conflict with the use of intramedullary nails in gunshot fractures. Although the use of internal fixation in the presence of potential or established infection is contrary to accepted surgical principles, he suggested that there are situations in which intramedullary nailing nonetheless may be justified. Experience with primary nailing of open fractures was unfortunate, and gave rise to the dictum that nailing never should be done at the time of primary debridement, but should be delayed at least until the time of delayed closure. Even in less ideal circumstances, as in the instance of extensive loss of soft tissue when fixation by other means is inadequate, or in the face of prolonged infection in spite of adequate drainage, or when transportation is demanded by military necessity, nailing

may offer a practical solution. Production of satisfactory healing in 25 of 28 such cases would seem to justify this conclusion. Serious complications occurred only when overly optimistic surgeons closed the wounds either primarily or secondarily. The results were best in those wounds permitted to close spontaneously. It was suggested that the failures seen were caused by errors of judgment and were not attributable to the technic.

Greville and Ivins³⁷ reviewed 14 cases in which fracture of the femur occurred in children. They observed overgrowth after any type of femoral fracture but found it proportionate to the amount of callus. Overgrowth was noted most frequently between the ages of 4 and 8 years. Acceleration of growth was limited to the first year after fracture. The greatest increase was observed among patients treated by open reduction or with anatomic closed reduction after severe displacement. They found that posterior angulation at the site of fracture was of little moment but that lateral angulation did not correct and that angulation with the apex anterior corrected poorly. Pease³⁸ advocated conservative treatment prior to the age of 13 years and suggested that 2 cm. of overriding be permitted to compensate for stimulation of growth. Neer and Cadman³⁹ reviewed 100 such fractures and added to the foregoing the observation that overgrowth did not occur in undisplaced fractures, but, in other studies when it did occur, it persisted permanently without subsequent compensation during the period of growth. Contrary to the opinions of other authors, they reported correction of both angulation and rotary deviation. There is complete accord with the opinion that all fractures of the femur in children should be treated by closed methods, that nonunion is unknown if closed reduction is used, and that nearly all complications which occur are the consequences of immoderate treatment.

SURGERY OF JOINTS

Smillie,⁴⁰ in his paper on osteochondritis dissecans, recommended replacement of dissecting osteocartilaginous fragments and, when necessary, nail fixation. On the basis of his observations that osteocartilaginous fragments occurring in osteochondritis dissecans in children heal with rest, he postulated that these may be similar to other fractures and that failure to heal may result from insufficient immobilization. He suggested that osteochondritis dissecans be treated as nonunion would be treated. If the fragment was not displaced, he proposed drilling

the fragment and, if it was displaced, replacing it into a freshened bed secured by a specially designed nail. Roberts⁴¹ lent editorial support to the idea.

Murdoch⁴² compiled statistics on the errors of diagnosis in 2,668 arthrotomies of the knee performed for torn meniscus. In 4.5 per cent of cases, the cartilage was found to be intact. More than half of the errors were made among patients who had, instead, tears of the anterior cruciate ligament. Attention to detail in examination, and particularly to Jones's⁴³ observation that extension of the knee is necessary to produce localized pain, will obviate many of the errors. In women, recurrent subluxation of the patella was the most frequently missed diagnosis.

RECONSTRUCTIVE SURGERY

Continuing development of devices to supplement the already extensive list of available prostheses for replacement of the femoral head suggests that the ideal is lacking. The most imposing new apparatus this year was Lippmann's⁴⁴ "transfixion hip prosthesis." This was developed to satisfy his impression that preservation of length of the femoral neck, meaning the acetabulum-to-trochanter distance, is prerequisite to satisfactory abductor function. In addition, this multipartite prosthesis was designed to truss the point of most frequent breakage: the angle of the neck of the appliance. His results appear similar to those reported for other prostheses.

Moore⁴⁵ supplemented his previous reports with a review of 159 cases in which his "self-locking hip prosthesis," inserted through a "southern approach," was used. He observed, as others have, that the best functional results can be expected after fractures of the femoral neck and that, in osteoarthritis, the extra-articular changes are inimical to excellent mechanical recovery.

Aufranc⁴⁶ is an advocate of the Vitallium mold arthroplasty, and has reviewed 1,000 cases in which the procedure was done. He is explicit in his recommendations that use of the hip for weightbearing be delayed until the bone surfaces have completely healed and that full range of painless motion must antedate any attempt to regain muscle power. His reported results compare favorably with those reported for the use of prostheses. This seems an important contribution at a time when enthusiasm for replacement has followed a wave of disillusionment with cup arthroplasty.

Chormley's⁴⁷ discussion of the present status of surgery of the hip joint is a singularly lucid

application of common sense. Since the paper covers so extensive a subject, it lends itself poorly to condensation, but his disapprobation of osteotomies and his conservatism toward replacement of the femoral head in the presence of fresh fracture are impressive.

PHYSIOLOGY

Ponseti⁴⁸ has continued his work on the effects of aminonitriles upon several species. The action was found to be tissue-specific, affecting mesodermal tissues, including the ground substance of cartilage. He again observed lesions similar to those of Legg-Perthes' disease and slipped femoral epiphysis but found that the lesions were not limited to the hip joints. He observed disturbances of the vertebral end plates simulating idiopathic scoliosis, which similarity is further implied by the occurrence of abnormal protein metabolites in the urine of patients who have idiopathic scoliosis. Other lesions resembled those of Osgood-Schlatter's disease and of Paget's disease. Dissecting aneurysms caused by degeneration of the media regularly developed in immature rats. The biochemical basis for this remains obscure, but it is suggested that the clinical syndromes could be caused by inability of some persons to neutralize nitriles produced in protein catabolism.

Bonner and associates⁴⁹ and Nobles and associates⁵⁰ have described a fractionation of serum acid phosphatase according to the method of Fishman and Lerner,⁵¹ which differentiates the acid phosphatase of prostatic origin. Whereas values for total acid phosphatase are notoriously unreliable as indices among patients with prostatic carcinoma, the L-tartarate-inhibited fraction is uniformly elevated among patients with metastatic lesions. This should provide a much more reliable diagnostic tool for the distinction of osteoblastic lesions.

SURGERY OF THE SPINAL COLUMN

The surgical treatment of scoliosis was thoroughly discussed by Meredith and Moe⁵² and Moe.^{53,54} In several papers, they outlined the treatment of idiopathic and paralytic scoliosis. The importance of early treatment of idiopathic curves was emphasized, and the importance of re-establishment of compensation of the curves was stressed. Even though the measurable correction may be small, if it permits compensation, the apparent correction will be rewarding. The technical details of determination of the nature of the curve, the identity of the primary curve, and the determination of the length of fusion with regard to structure and age were discussed

with unusual clarity. With the current modification of the facet-fusion procedure and the use of iliac bone below the level of the twelfth thoracic vertebra, the incidence of fusion is 85 to 90 per cent. In the presence of paralytic scoliosis, as in the presence of the idiopathic type, the incidence of pseudoarthrosis decreased from 50 per cent when the Cobb type of fusion was employed to 30 per cent when facet fusion was used and to 13 per cent when the use of autogenous bone was added.

SURGERY OF PERIPHERAL NERVES

Phalen and Kendrick⁵⁵ expressed the growing opinion that the diagnosis of compression neuropathy in the carpal tunnel is overlooked too often. They agreed with other authors that the common causes are nonspecific synovitis and rheumatoid arthritis. In their series of 71 patients, 39 presented bilateral involvement with the usually reported preponderance of women. Ninety-six per cent exhibited hypesthesia or paresthesia distal to the wrist in the median distribution, 54 per cent had weakness of the thenar muscles, and Tinel's sign was elicited in 98 per cent. The result of the flexion test was positive in 73 per cent of cases. The frequent variability of innervation of the thenar muscles is a common source of diagnostic confusion. After operation, relief of pain was constant, with return of sensation in 64 per cent and of muscle function in 50 per cent.

PATHOLOGIC ASPECTS

Coventry and Dahlin⁵⁶ reviewed the experience of the Mayo Clinic with osteogenic sarcoma, their series including 490 of 2,276 tumors of bone. Osteogenic sarcoma represented the most common malignant primary tumor of bone, except melanoma. It was defined as "a malignant tumor of bone, the proliferating neoplastic cells of which produce osteoid." They recognized lesions which were predominantly fibroblastic, chondroblastic, or osteoblastic. In spite of these differences of major cell types, the logic of their aggregation is supported by the similarity of distribution according to age and location and the prognosis. Of the entire group, 50 per cent occurred about the knee, 50 per cent developed between the ages of 10 and 19 years, and 50 per cent were of the osteoblastic type. Of the patients, 19.3 per cent survived 5 years and 15.3 per cent survived 10 years. The number of survivals was materially higher when the lesions affected the tibia than when they were situated above the knee. Radical ablative therapy was judged to be obligatory, and at that institution

it is performed between two tourniquets immediately after diagnosis is established by study of fresh-frozen sections. Parosteal osteogenic sarcoma was distinguished by its later appearance, its slower growth, and its tendency toward later metastasis.

McLeod and associates⁵⁷ documented the Mayo Clinic series of fibrosarcoma of bone. They defined this tumor as a primary tumor of bone, the fibroblastic malignant cells of which produce no osteoid material. Although fibrosarcoma was found to be different in respect to such factors as the older age of the patient at the time of onset, the close imitation of fibroblastic osteogenic sarcoma in respect to site, appearance, and prognosis renders the distinction of fibrosarcoma primarily academic. It is worth noting that this tumor occurred in 10 instances at the site of previously verified benign giant-cell tumor, 9 of which had received roentgen rays in the course of treatment.

Carroll⁵⁸ collected 10 cases of osteogenic sarcoma of the hand, a location distinctly unusual for a malignant lesion. Of these sarcomas, 2 followed irradiation administered for other conditions. The prognosis associated with the tumor in this location was unusually favorable, justifying digital amputation.

Lichtenstein,⁵⁹ in his discussion of aneurysmal bone cyst, and Kelikian and Clayton,⁶⁰ in their report of giant-cell tumor of the patella, tended

to substantiate the growing caution toward the use of roentgen rays for the treatment of benign lesions because of the risk of sarcomatous transformation.

This thesis was accorded additional support by Cruz and associates,⁶¹ who listed 11 cases in which osteogenic sarcoma arose after large doses of irradiation was administered for other conditions. They added the impression that there is more danger of malignant change after the use of 100 to 250 kilovolt therapy than after million-volt irradiation. They admit the questionable validity of their observation, in view of the frequent long interval between treatment and malignant degeneration, but the lower absorption of energy per roentgen in bone makes their supposition credible.

Allen⁶² reviewed the evidence of Spitz⁶³ that juvenile melanoma, a benign lesion, may occur in adult persons and that melanocarcinoma likewise occurs in children. This controverts the supposition that lesions have changed their character at puberty and questions the assumption that apparently malignant melanomas of childhood will have a benign course. He found these lesions histologically separable.

Dahlin's⁶⁴ exhaustive monograph, reviewing more than 2,000 tumors of bone seen at the Mayo Clinic, defies brief abstraction, but is a distinguished work which demands the attention of anyone interested in neoplasms of the skeleton.

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IF FACIAL CARCINOMA is treated adequately, disfigurement, recurrence, prolonged morbidity, and early death should be prevented.

Surgical treatment should be performed if (1) the defect can be reasonably reconstructed; (2) the tumor recurs after irradiation or over tissue that constitutes poor stratum for radiotherapy; or (3) the tumor is radioresistant. Since skin grafting can repair any defect after excision of an operable tumor, the primary handicap is inadequate excision. Small skin carcinomas should be excised along with $\frac{1}{2}$ cm. of healthy tissue on all sides. A large tumor should be excised well beyond the border to a distance of at least one-half its diameter, deep as well as laterally. Adequacy of excision should be determined by frozen sections at the time of operation.

Irradiation may be helpful in areas difficult to repair and in radiosensitive tumors curable without permanent atrophy or ulceration. Radiotherapy is difficult where bone or cartilage is contiguous and may cause osteonecrosis, which often is followed by intractable pain. Cancer originating in an area atrophied by irradiation cannot be treated successfully by further irradiation.

DOUGLAS W. MACOMBER, M.D., Denver. *Plast. & Reconst. Surg.* 22:541, 1958.

Lobe of the Azygos Vein Occurring on the Left

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THE ROENTGENOGRAPHIC APPEARANCE of lobus venae azygos, a now commonly recognized abnormality of the right upper lobe, was first described and interpreted by Velde¹ in 1927. The lobe was named after its discoverer, Heinrich August Wrisberg, who first described it in 1777. Boyden² states that Wrisberg's observations were made on a cadaver of a 3-year-old boy in whom an aberrant configuration of the azygos vein and an azygos lobe were present bilaterally.

In a combined tabulation of 323,641 individuals, Anson and his colleagues³ found the roentgenographic incidence of azygos lobe on the right to be 0.59 per cent. However, the occurrence on the left side is quite rare. In fact, Kane⁴ as late as 1952 stated that "The azygos lobe contains a variable portion of the apical segment of the right upper lobe and occurs only on the right side, being seen in about 1 per cent of chest roentgenograms." To date, 11 cases of lobes of the azygos vein on the left side have been reported in world literature.⁵⁻¹⁴ In only one of these cases, that of Wrisberg, was there anatomic confirmation. In all of the others, the diagnosis was made on the bases of the roentgen findings alone. This lack of anatomic proof does not preclude that the abnormality is nonexistent. It is the purpose of this paper to show (1) that an azygos lobe can and does occur on the left side, (2) that the diagnosis can be made roentgenographically, and (3) that its recognition is important in differentiating it from pathologic lesions. The case to be reported here constitutes the first such case to appear in the American literature.

ETIOLOGY AND ANATOMY

The exact etiology of the left-sided azygos lobe is obscure because of the lack of anatomic material available for study. Therefore, a brief description of the development on the right side

is presented. The immediate cause of the abnormality is an alteration in the relationship of the developing lung to the developing azygos vein.¹⁵

In a 10-mm. human embryo, the primitive apex of the right lung lies medial to the arch of the right posterior cardinal vein, the precursor of the upper thoracic portion of the azygos vein.² As the heart descends from its cervical to its thoracic position, it draws the posterior cardinal vein forward and downward. Prior to its descent, the vein shifts its position so that it eventually lies entirely within the mediastinum. During this shift, the arch of the future azygos vein passes over (cephalad to) the apex of the right lung. If the vein should fail to shift in position, the subsequent descent of the heart would drag the arch of the vein along with a fold of both parietal and visceral pleurae downward into the apex of the lung.^{2,16} The pleural septum that is thus formed is known as the mesoazygos or azygos membrane. The azygos vein and the mesoazygos are related to one another like the small intestine and its mesentery.

The presence of the left azygos lobe is indicative of an anomalous azygos system. Either there is a transposition of the azygos vessels or a paired development.⁷ Wrisberg's case, in which the left azygos system drained into the left innominate vein, apparently was of the latter variety. Of course, other vascular anomalies are conceivable. The embryologic considerations would be the same as on the right side.

Roentgenographically, the appearance of the left-sided azygos lobe closely resembles that on the right. The anatomy of the lobe is best demonstrated by means of body section radiography, as this proves the presence of a pleural septum—the mesoazygos—which, by definition, indicates an associated accessory lobe formation.¹³ A laminagram of the left upper lung field reveals a fine line, the mesoazygos, which descends from the left apex curving downward and inward with its convexity lateral, and expanding at its lower end to enclose a drop-like shadow, the azygos vein. This shadow usually is located medially,

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Fig. 1. Laminagram of left apex at 13 cm. from the posterior chest wall which shows the mesoazygos expanding to enclose the azygos vein. Note how the mesoazygos has begun to disappear at this level.

immediately adjacent to the left border of the mediastinum. Occasionally, however, as in the case to be reported here, the azygos vein may assume a more lateral position, being found at some point along the course of the mesoazygos

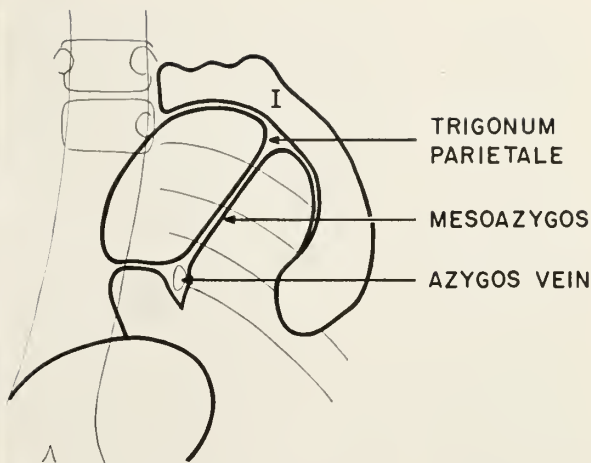


Fig. 2. Tracing of figure 1.

(figures 1 and 2). The amount of lung tissue cut off by the vein is quite variable. The mesoazygos may pass obliquely toward the hilus from the lateral side of the apex, lie in a vertical plane splitting the apex, or be in a plane medial to the apex. At the origin of the mesoazygos on the internal thoracic wall, there is a triangular shadow known as the trigonum parietale. This represents the costal pleura as it meets and sinks into the lung parenchyma, thus forming the mesoazygos.

CASE REPORT

E. H., a 58-year-old white male barber, was admitted to Jackson Memorial Hospital in a semistuporous condition. He gave a history of dizziness and headaches for one

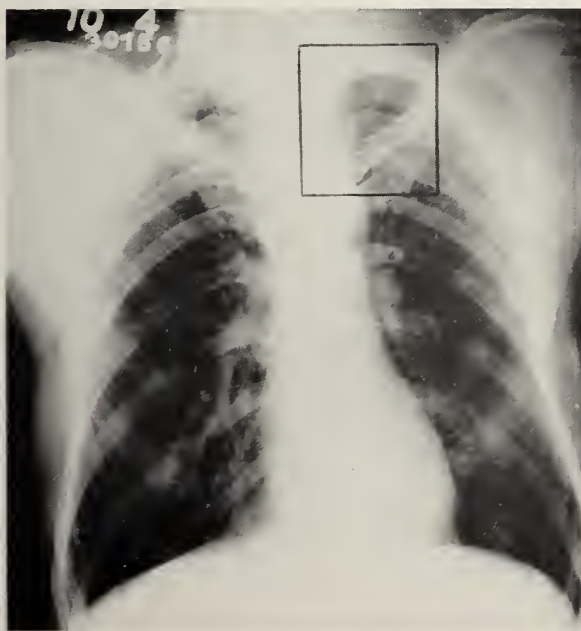


Fig. 3. Posteroanterior roentgenogram which shows a fine linear shadow, the mesoazygos, in left apex.



Fig. 4. Enlargement of area indicated in figure 3 which again shows the mesoazygos.



Fig. 5. Laminagram of left apex at level of 11 cm. from the posterior chest wall, showing the trigonum parietale and the mesoazygos. The azygos vein is not definitely visible.

to two years. Recently, he had exhibited personality changes and a memory deficit. A pneumoencephalogram showed generalized cerebral atrophy. Neurologic examination was unremarkable. A clinical diagnosis of cerebral arteriosclerosis was made. The patient had no signs or symptoms referable to the respiratory or cardiovascular systems.

A routine posteroanterior film of the chest (figures 3 and 4) revealed a fine linear shadow in the left apex which ran obliquely from the lateral portion of the apex to the left border of the superior mediastinum. The shadow was also evident on lateral and oblique projections. These findings suggested the diagnosis of a left azygos lobe. This was confirmed by laminagraphy. The remainder of the chest was unremarkable.

The abnormality in the left apex first appeared in the laminagram made at a distance of 10 cm. from the posterior chest wall. In contrast to the plain film of the chest, this cut showed that the mesoazygos had two linear components. The line originated laterally in a triangular expansion, the trigonum parietale, and descended obliquely downward and medially to a point just above the aortic arch. Here the line turned abruptly and ran horizontally toward the midline and was finally lost at the mediastinum (figure 5). The cuts made at 10, 11, 12, and 13 cm. from the posterior chest wall were quite similar, whereas, at 14 cm., the mesoazygos became indistinct. In the 13-cm. cut (figures 1 and 2), the mesoazygos, at the point it changed direction, ex-

panded to enclose a dense circular opacity which undoubtedly was the azygos vein. This was not well seen on the other cuts, suggesting that the vein ran forward and upward in an almost true posteroanterior direction. The most likely explanation here would seem to be that the primitive cardinal vein persisted as a left azygos vein which drained into the left innominate vein.

SUMMARY

A case of left-sided lobe of the azygos vein is reported. This is the twelfth case reported in the world's literature and the first case in the American literature. A brief discussion of the etiology and pertinent anatomy is presented.

The diagnosis in this case was suspected on routine chest films and was proved by means of laminagraphy. Roentgenographic recognition of this rather rare abnormality is important as it may be confused with pathologic lesions.

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Diphtheria

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DIPHThERIA is an infectious disease characterized by a pseudomembrane in the pharynx, on the tonsils, and in the nasal or laryngeal tissues. A powerful toxin is absorbed from the infected area, which has the tendency to cause serious effects on the heart and on nervous and renal tissue particularly. The local symptoms may be mild or those of complete obstruction of the larynx or palatal paralysis. Diphtheria occurs endemically and epidemically everywhere in the world, being most prevalent in temperate zones during the winter months. It is rare during the first 6 months of life, reaches its peak incidence between 2 and 5 years of age, and then declines after 10 years of age. Infection is caused by contact with a person with the disease or with a carrier; milk, water, insects, and animals are not thought to be involved. Of interest is Bradford's statement that the incidence of diphtheria is significantly diminished among tonsillectomized school children in Baltimore and in Rochester, New York.

The disease is caused by *Corynebacterium diphtheriae*, which is a gram positive bacillus with granular cytoplasm often exhibiting dark staining polar bodies at or near the ends of its body when stained with methylene blue. Characteristically, it is slender and slightly curved and sometimes clubbed, tending to arrange itself in parallel groups or v-shaped formations. The best smears are those prepared from cultures grown on Löffler's agar. The organism is easily destroyed by heat and weak antiseptics but survives for several weeks in water, ice, milk, or

dried mucus. There are three types: the gravis, the intermediate, and the mitis in descending order of their supposed severity, but there seems to be no constant correlation between the severity of a case with any given type. The worst cases of diphtheria are usually those in which the hemolytic streptococcus is also implicated. Only 0.02 cc. of the toxin is the minimum lethal dose (M.L.D.) required to kill a guinea pig, and 1/50 of this dose is used for the Schick test to determine man's susceptibility to diphtheria.

HISTORY

Diphtheria was recognized to some extent in ancient times, but it was first described in this country by Bartlett in 1754 and by Bard in 1771. Bard described an epidemic in New York which was undoubtedly diphtheria, to which he gave the name "angina suffocativa." The disease was named by Bretonneau in 1826 when he called it the French word "diphtherite."

In 1883, Klebs demonstrated the diphtheria bacillus microscopically from pseudomembrane, and Löffler identified the organism in pure culture in 1884. Roux and Yersin described the toxin in 1888. The antitoxin was discovered by von Behring in 1894, and he and Theobald Smith suggested the use of toxin-antitoxin. This method of active immunization was put into use by Park and Zingler in 1913. The Schick test for determining susceptibility to diphtheria was discovered in 1913 and named for its originator. Diphtheria toxoid for active immunization was first described by Ramon in 1922.

Diphtheria has decreased greatly in occurrence since the introduction of toxin-antitoxin and toxoid for active immunization. The use of antitoxin and, later, antibiotics for treatment has further reduced its destructiveness. Tracheotomy and intubation have proved lifesav-

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ing in many cases of the laryngeal type. In 1916, 5,358 persons in England and Wales died from diphtheria, and, during the latter part of the nineteenth century and the early part of the twentieth century, incidence and mortality were extremely high in this country. Between 1933 and 1953 in the United States, the number of cases of diphtheria declined from over 18,000 to about 2,000 per year. Although several thousand cases still occur every year, the number of deaths has been kept low by prompt recognition and treatment. In 1950, 1951, and 1952 there were 410, 302, and 217 deaths, respectively.

PATHOLOGY

Pathology of diphtheria is both local and systemic. The local lesion is a pseudomembrane made up of necrotic epithelium, serum, blood, and bacteria. Although it is most often found in the pharynx, it may extend into the larynx or into the postnasal area where it is usually associated with serosanguineous nasal discharge. It may also originate as a cutaneous lesion or in a surgical wound. Systemically, the toxin attacks the heart and causes pallor and degeneration of the myocardium. It may also cause tubular changes in the kidneys and paralysis of the palate, ocular muscles, or the extremities as a result of its effect on the myelin of the nervous tissue. Paralysis of one or more muscle groups occurs in about 10 per cent of cases. The cervical lymph glands are greatly enlarged in severe cases, causing a typical "bull neck." Sometimes the liver and the blood clotting mechanisms are disturbed so that serious hemorrhage may occur.

DIAGNOSIS

The incubation period is five to seven days. Symptoms of diphtheria usually begin with low-grade sore throat, malaise, and moderate fever. The breath is foul. When nasal involvement is present, there is a bloody serous nasal discharge. If laryngitis occurs, there is gradual progression of brassy or croupy cough associated with increasing stridor and retraction of the chest. Since the disease occurs most frequently in children under 5 years, it may be confused with the more common types of croup. For the differentiation of laryngeal diphtheria and other forms of laryngitis or croup, a trial of steam and ipecac is helpful, as croup usually improves with that type of therapy. Laryngoscopy may be necessary in the more severe cases. When doubt exists about the diagnosis in these cases and prompt response to therapy is not evident, tracheotomy should be done early and not be delayed for the

signs of exhaustion or asphyxia. Retraction and persistent restlessness are indicative signs for tracheotomy.

Pharyngeal diphtheria, which is the most common type, may be confused with acute tonsillitis due to the hemolytic streptococcus or similar bacteria, although, in the latter cases, onset is usually much more acute with higher fever, pain on swallowing, and a greater tendency for localization of the exudate on the tonsils. Streptococcal or scarlet fever lesions usually exhibit punctate erythema on the soft palate and pharynx together with yellow purulent exudate associated with the pronounced febrile reaction.

Herpetic pharyngitis usually is vesicular and often exhibits lesions on the tongue, gums, and lips. Thrush usually occurs in infants, and the lesions are characteristically white and superficially filamentous, occurring in all parts of the mouth. Congenital syphilis and foreign body reaction must sometimes be differentiated from nasal diphtheria. Necrotic mucous membrane occurring after tonsillectomy may closely resemble diphtheria.

For exact diagnosis, a culture from the nose and throat should be taken and planted on Löf-
fler's agar. Routine laboratory diagnosis was first carried out by F. Westbrook in Minnesota in 1895. When clinical diagnosis is questionable or a carrier state is suspected, a virulence test is carried out to differentiate diphtheria bacilli from harmless diphtheria-like organisms (diphtheroids). The virulence test is performed by intracutaneous injection of material from a nose and throat culture into 2 guinea pigs, 1 of which has been protected by 500 units of intraperitoneal diphtheria antitoxin. If the injected area becomes red and indurated in the unprotected guinea pig in forty-eight to seventy-two hours and there is no reaction on the other guinea pig, one may be sure that the culture contains virulent diphtheria bacilli.

PREVENTION

Prevention by the use of toxin-antitoxin mixtures and, presently, by the use of toxoid has reduced susceptibility and incidence of diphtheria to a low point of approximately only 2,000 cases in this country each year. The most widely used product today is the triple vaccine for prevention of diphtheria, tetanus, and whooping cough. This is usually started at 1 to 4 months of age, the average being 3 months. It is given intramuscularly in 3 doses one month apart. This method has been found to result in adequate immunity against all 3 diseases. There are various routines for maintaining immunity by boost-

er injections. The most satisfactory of these consists of giving a triple booster injection one year after the initial series and then every two to three years thereafter throughout childhood. Some physicians have found local and systemic reactions more severe after 10 years of age and suggest using the diphtheria-tetanus combination rather than the triple injection after that age. The fluid toxoid, that treated with a small amount of formalin, seems to be less irritating to the tissues than the alum precipitated toxoid which is adsorbed more slowly. A modification of the latter, aluminum-hydroxide-adsorbed toxoid, is as effective and appears less prone to cause local or systemic reactions. With the use of this material, it has been possible to continue using the triple toxoid into the early teens with few and minor reactions. It should be mentioned that, if an outbreak of diphtheria occurs in a community, a booster injection is desirable even if only six months to a year has elapsed since the last booster injection, or a Schick test may be done instead. One should also point out that some authorities now recommend the routine booster injections at less frequent intervals than advised here. However, in view of the drop of antibodies one and one-half to two years after toxoid, we still feel that the above recommendations are desirable.

The Schick test to determine susceptibility to diphtheria consists of the intracutaneous injection of 1/50 M.L.D. of toxin in 1/10 cc. of diluent. If susceptibility is present, an area of reddish discoloration and edema appears within twenty-four hours, fading after five to seven days. The reaction may vary from a moderately red area the size of a dime to a much larger area with marked swelling and vesiculation. A pseudoreaction may occur in an immune individual with redness and swelling appearing at the injection site within a few minutes to twenty-four hours and disappearing within seventy-two hours. In view of the difficulty in identifying a pseudoreaction in some cases, a control test containing the diluent only may be injected into the skin of the opposite forearm for comparison. Some physicians give a Schick test routinely one to two years after toxoid to determine whether satisfactory immunity has developed, while many other physicians at present substitute the regular booster injections of DPT as a safe means of maintaining adequate immunity.

If an unprotected person is exposed to a case of diphtheria, it is wise to give 1,500 units of antitoxin intramuscularly after testing for sensitivity to horse serum. Inasmuch as the diph-

theria bacillus is also quite susceptible to penicillin, and to some extent to other antibiotics, one should also give 600,000 to 1,200,000 units of long-acting Bicillin, depending on the age of the patient, if there is no history of penicillin sensitivity. Such contacts should also have 2 negative throat cultures spaced twenty-four hours or more apart, the last obtained five to seven days after the last contact with the diphtheria patient. It goes without saying that the patient himself must be rigidly quarantined and have 2 consecutive negative nose or throat cultures after clinical recovery has taken place before being released from quarantine.

The diphtheria carrier presents a hazard in spread of the disease. The incidence of convalescent carriers has been reduced by treatment of diphtheria with penicillin as well as antitoxin. Penicillin alone has been found frequently effective in clearing the carrier state. Removal of foci of infection, such as tonsils or adenoids, is sometimes necessary. When a carrier state persists, the organisms should be tested for virulence. Of course, carriers of virulent diphtheria bacilli must be isolated until the organisms are eliminated.

TREATMENT

Complete bed rest is recommended for at least two weeks and longer in some cases. If signs or symptoms arise of cardiac involvement, an electrocardiogram should be obtained. Symptomatic treatment consists of analgesics, such as codeine and aspirin, and an ice collar, gargles or throat irrigations with warm normal saline solution, and cool or tepid sponges. Diet may be recommended as tolerated, usually consisting of liquids in adequate amounts and soft foods. In severely ill toxic patients, intravenous glucose is indicated. Adequate fluid balance, calories, and vitamins must be maintained.

Specific treatment consists of both antitoxin and antibiotics, with penicillin being the antibiotic of choice if well tolerated. Before giving antitoxin, the patient must be tested for sensitivity to horse serum. This is done by the intracutaneous injection of 0.05 cc. of a 1:20 dilution of antitoxin or horse serum. A positive reaction occurs within ten or fifteen minutes, consisting of erythema and/or a wheal at the site of injection or general symptoms of anaphylaxis. One must be prepared to apply a tourniquet and administer Adrenalin if a general reaction takes place. Another way of testing for sensitivity is to place a drop of 1:20 antitoxin into the conjunctival sac. If no erythema occurs within thirty minutes, one may safely say that no sensitivity

exists. If a positive reaction occurs, Bradford recommends the following routine for desensitization with injections fifteen minutes apart if no reaction to the previous injection occurs:

1. 0.05 cc. of a 1:20 dilution of antitoxin subcutaneously.
2. 0.05 cc. of a 1:10 dilution of antitoxin subcutaneously.
3. 0.1 cc. of undiluted antitoxin subcutaneously.
4. 0.2 cc. of undiluted antitoxin subcutaneously.
5. 0.5 cc. of undiluted antitoxin subcutaneously.
6. 0.1 cc. of undiluted antitoxin intravenously.
7. The remainder of the therapeutic dose is slowly injected intravenously.

If a reaction occurs after an injection, one should wait an hour and then proceed with the same amount as the last dose which did not cause a reaction.

In cases of faucial or nasal diphtheria of average severity, 10,000 to 20,000 units of diphtheria antitoxin intramuscularly is an adequate amount. In severe cases or in cases of laryngeal diphtheria, the amount of antitoxin should be tripled or quadrupled with one-half given intravenously and one-half intramuscularly. The full dosage of antitoxin must be given at one time as early in the disease as possible, as it does not neutralize toxin already combined with body cells but only that which is still free in the blood and other body fluids.

Penicillin in full doses is given in addition to, not in place of, antitoxin. It should be continued until signs of clinical disease disappear and until 2 consecutive negative cultures are obtained at least twenty-four hours apart. In a case of moderate severity, 600,000 units of intramuscular aqueous procaine penicillin every other day is adequate. In more severe cases, this amount should be given daily or replaced with 30,000 to 50,000 units of regular aqueous penicillin every three hours.

The patient with laryngeal diphtheria must be watched closely for signs of hypoxia, exhaustion, and toxicity. If obstruction progresses to the point of tiring or restlessness in spite of oxygen, tracheotomy should be carried out before this becomes extreme. Intubation, a procedure sometimes recommended, is not as effective as tracheotomy, and there is too much danger of the tube being coughed or forced out of the

trachea unexpectedly. Constant nursing care, suctioning, oxygen, and all other supportive therapy are of course necessary for the child with laryngeal diphtheria.

Myocarditis may occur early or late in the disease. Treatment consists primarily of supportive therapy. Digitalis is said to be contraindicated, but some authorities recommend it for cardiac decompensation. Intravenous glucose is thought to have some protective action on the myocardium.

Paralysis of one or more muscle groups occurs in about 10 per cent of cases. Palatal paralysis, the most common, may develop during the first or second week of the disease, requiring suction, postural drainage, tube feedings, and even tracheotomy. Ocular muscle paralysis sometimes occurs during the third week or later; slow spontaneous recovery is the rule. Respiratory or general paralysis occasionally develops as a late complication, sometimes requiring a respirator in addition to other therapeutic measures. If death does not result, complete recovery is the rule. Bronchopneumonia, when it occurs, usually comes as a complication of laryngeal diphtheria or with paralytic complications and is treated specifically. Nephritis occurs in approximately 10 to 15 per cent of cases.

SUMMARY

The incidence and mortality rate of diphtheria have been reduced tremendously since the first pioneer discoveries of the disease in 1883 and 1884. At the present time, approximately 2,000 cases occur in this country each year, with a mortality rate of 4 or 5 per cent. The routine immunization of infants and children with diphtheria toxoid or DPT has been the most important factor in this reduction. Prompt recognition and treatment of each case of diphtheria with antitoxin and penicillin are essential if mortality is to be reduced still further. Rigid isolation of patients and carriers is another essential requirement.

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The Child with Aphasia

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A LARGE NUMBER OF CHILDREN within our pre-school population give evidence of severe language disorders, which reduce their abilities to understand or express speech and language. Language development can be impeded by many factors, among them mental retardation, emotional disturbance, deafness, and aphasia. Each causal factor requires different diagnostic procedures to determine the nature and extent of the problem. In symbolic language disorders, such as aphasia, where all facets of the child's development and performance must be considered, the evaluation is extremely complex.

The diagnosis and treatment of aphasia in children is a comparatively new area of study, and there is still confusion in classifying or identifying the condition. Although the majority of aphasic children have psychomotor behavior patterns that are similar to those observed in children who have known cortical damage, some of those with aphasia show no recognized neurologic reasons for such problems in communication.¹⁻³ Psychologic tests indicate that children with aphasia have normal or near normal intellectual potential even though test items which require the integration and comprehension of symbols are significantly reduced.⁴ Otologic and audiologic evaluations reveal that these children have hearing patterns which are grossly inconsistent, so that at times the child is able to use his hearing functionally and at times he is not.⁵ Language examinations show that children with aphasia are confused by auditory and visual symbols, and these problems result in severe learning disorders.^{6,7}

It is partially because of the complexity of this disorder that many children with aphasia are erroneously diagnosed as mentally retarded, emotionally disturbed, or deaf. In addition to these classifications, such nebulous labels as "developmental retardation" or "delayed speech"

are sometimes used, which leads to confusion and difficulty in finding adequate therapy or training programs designed to reduce the educational problems that accompany aphasia in children.

The educational needs of the aphasic child are currently creating nation-wide concern. Although there are several residential programs with facilities and staffs for the education of such children, these programs are not always financially possible for families with moderate incomes. Nonresidential programs and specialists in language disorders are at a minimum. State aid, often available to the blind, deaf, or mentally retarded, is presently denied the child with aphasia. This frequently tempts the diagnostician or the educator to emphasize the problem of auditory reception, so that these children can receive some educational consideration by being accepted in an organized program for the deaf child.

Regardless of these frustrations, recent progress has been made in the study of aphasic children. The scientific contributions from neurology, pediatrics, psychiatry, otology, psychology, audiology, and speech pathology have emphasized the need for further study of these children.

ETIOLOGY AND CLASSIFICATION

Aphasia in children is usually caused by cortical damage, insufficient cortical development, or malfunction of the association pathways of the brain.³ Aphasic children usually have histories which include, among other factors, the incidence of severe febrile episodes, anoxia, rubella, toxemia, encephalitis, meningitis, or head injuries. The physiologic disturbance that is most common to all of these agents is the impairment of blood flow, so that oxygen and sugar needed to keep the cellular machinery of the brain functioning is significantly reduced.² The possibility that the problem may be familial has been considered as a probable etiology. Studies are presently in progress in an attempt to support or negate the genetic aspects of the disorder.⁵

The term aphasia is often defined as a lack or partial lack of speech resulting from injury

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to the brain. Realistically, the problem is much more complex. More accurately, aphasia in children refers to the child's inability to use symbols for communication. The term *symbol* in this context refers to an abstraction, which represents a concrete object, person, or thing. For example, the word *dog* is a verbal symbol for an animal; *brother* is a verbal symbol for a person; and *ball* is a verbal symbol for an object. The term aphasia, then, indicates a problem in both the reception and expression of language. Aphasia is not a problem in speech production alone. In isolation, this disorder is not complicated by permanent mental deficiency, severe emotional disturbance, or peripheral deafness. However, this does not negate the fact that aphasia can exist as a part of a multiple problem. If a child has sustained cortical damage, there is a significant possibility that central deafness, exogenous mental retardation, related emotional disturbance, or aphasia may be present in any combination.

As indicated previously, there is still confusion in the terms used to classify aphasia in children. Some specialists prefer to use the term *dysphasia* to indicate a partial problem, reserving the term *aphasia* for total or complete inability to communicate by means of language symbols.² Others have selected more descriptive terms, such as *speech aphasia*, *visual aphasia*,¹ or *euphasia*.³ The most widely used classifications appear to be *expressive aphasia*, *receptive aphasia*, *central aphasia*, or *mixed aphasia*.⁵

The development of normal language depends upon the reception and integration of incoming stimuli before the expression of language can logically follow. Functionally, language can be divided into 3 types:⁵ *expressive language*, or the language used to communicate with others; *receptive language*, or the language used to understand what others say; *inner language*, or the language used internally for thinking or reflection. Children with aphasia are usually classified as having a primary problem in one of these 3 functions. It is unusual for a child to have a problem that is entirely receptive or entirely expressive.⁵ Usually, a child with aphasia has a *mixed* problem and shows evidence of reduced ability to understand or comprehend language symbols and limited expressive language. If a severe problem exists, such as a lack of language development or a severe inner language involvement, the problem is classified as *central aphasia*. The distinguishing difference between central aphasia and mental deficiency is the indication by psychologic tests that the intellectual potential of the child with aphasia is considerably higher than his actual performance level. This

higher potential is not present in the mentally deficient child.

DIFFERENTIATION

This paper does not intend to suggest specific diagnostic procedures to be used in the evaluation of aphasic children. These procedures have been discussed from various viewpoints.^{1-5,7} Generally speaking, the diagnosis of aphasia depends upon a case history, clinical observations, and specific test results which can support a diagnosis of cortical damage. The term aphasia indicates that this damage has resulted in a symbolic language disorder.

In order to study the aphasic child thoroughly, the child is often referred to a neurologist, pediatrician, otologist, psychiatrist, psychologist, audiologist, and speech pathologist before a complete language examination is undertaken.⁸ This discussion will be limited to the consideration of 4 major points that are necessary to the basic differentiation of aphasia.

1. The classification of aphasia in children assumes that the major factor separating this disorder from all other speech and language problems is the disturbance in symbolic language formulation. Although the deaf child does not develop speech normally, his lack of speech production is related directly to his inability to hear sound. Yet, deaf children may have integrated symbolic language in all language functions that do not require sound. The mentally retarded child functions at a retarded symbolic level, but symbolic formulation is not the only area of his deficiency. The development of symbolic language in the mentally retarded child develops in proportion to his mental age.⁵ The emotionally disturbed child may reject sound and may not talk, but his problem, again, is not relegated to a primary disturbance in symbolic formulation. Diagnostically, these differentiations are of extreme importance.

2. The symptoms of aphasia may resemble the symptoms of other childhood problems, but the causal factors are distinctly different. The mentally deficient child may have some abilities in which he is more proficient than others, but the general index of his performance indicates permanent retardation in all areas. Although the aphasic child may resemble the mentally retarded child because of an inability to perform adequately on standardized intelligence tests,⁴ the abilities involved, not the degree of retardation, is the important differentiating factor. The deaf child, because of his inability to hear sound, is unable to perform tests which require hearing for adequate performance. The aphasic child

may resemble the deaf child because of fluctuating responses to sound, but the differentiating factor is that the aphasic child has a normal hearing mechanism. The emotionally disturbed child has specific types of bizarre behavior which often renders him socially inadequate.¹ Although the aphasic child and the psychotic child may be confused diagnostically since both may have behavior problems, the behavior patterns of the former are directly related to cortical damage.⁵ Therefore, the symptoms must be analyzed with reference to the cause if habilitative planning is to meet the needs of the problem.

3. Aphasia in children cannot be diagnosed merely because all other possible diagnostic classifications have been excluded. If, in the diagnostic evaluation of a nonverbal child, he is found neither mentally retarded, deaf, nor emotionally disturbed, it is important to emphasize also that he may *not* be aphasic. The diagnosis of the nonverbal child is not advanced enough at the present time to use such a process of elimination with finality. There are many reasons for delayed speech of which we are not aware, and, unless the child has a symbolic formulation disorder, his problem cannot be classified as aphasia.

4. The child with aphasia requires an educational approach that is designed for this particular problem, and educational processes currently used for children with mental retardation, emotional disturbance, or deafness will not produce maximum results.⁹⁻¹² The mentally retarded child, because of the permanent nature of his problem, requires *drill* and *repetition* in order to retain basic educational principles. The emotionally disturbed child is usually seen in a *permissive* atmosphere with a psychoanalytic orientation. The deaf child requires auditory training and speech reading with specific educational procedures that are designed to help him *compensate* for his hearing loss. The aphasic child must be helped to *organize* incoming stimuli, so that they can be used more meaningfully for communication purposes.

EDUCATIONAL NEEDS

Because the aphasic child has specific educational needs, it is unwise to place him in educational programs designed for children with other problems. In fact, to do so is not only detrimental to the child with aphasia but also to the other children who are correctly placed in programs designed for their particular problems.

At the present time, there does not appear to be a single educational method that can be used with aphasic children without concern for the

differences and specific needs of each child. Perhaps this is as it should be. However, some definite theories have been proposed for the education of the child with aphasia. Some procedures stress the mechanics of speech.¹⁰ Others emphasize the ideas to be expressed or understood through speech and other forms of language.¹¹ Some programs are residential,^{10,13} others are not.^{11,12} Regardless of differences in approach or setting, most professional people concerned with the aphasic child agree that this child needs a specialized program. In such a program, parent-child relationships are of significant importance.¹⁴ Therefore, it remains the responsibility of the physician, psychologist, speech pathologist, and others concerned with special education to provide the necessary knowledge, facilities, and personnel for the education of the child with aphasia.

SUMMARY

Aphasia in children refers to the child's inability or severely limited ability to use symbols for communication. Differential diagnosis of aphasia is a complex process which requires the services of many different professional disciplines. Although the symptoms of aphasia may resemble those observed in children with mental retardation, an emotional disturbance, or deafness, the causal factors are significantly different. For this reason, aphasic children cannot learn adequately in programs designed for children with other problems. Progress has been made in the classification and identification of aphasia in children, but additional knowledge, facilities, and professional personnel are needed in order to provide for the education of these children.

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Meprobamate-Diuretic Therapy in Premenstrual Tension

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PREMENSTRUAL TENSION has been attributed to such diverse factors as menstrual toxins, various hormones released before menses, and psychosomatic response to these hormones and to stress situations.¹⁻⁵ Investigation of the premenstrual syndrome since its definition by Frank⁶ in 1931 has met with limited success. Severe premenstrual tension remains a distressing problem to those afflicted.

Both Pennington⁷ and Ferguson and Vermillion⁸ have surveyed "normal" women and have reported incidence of symptoms in premenstrual tension. In the latter's series of 150 closely observed women, the authors detected symptoms associated with anxiety and tension in 20 to 50 per cent. Irritability, for example, was reported by 43 per cent of the 150 women. Abdominal distention was mentioned by 50 per cent, although only 6 per cent noted swelling of feet and ankles, and only 3 per cent spoke of premenstrual weight gain.

Diuretic agents are frequently prescribed in premenstrual tension.^{1-5,9} Although the precise relationship between edema and premenstrual tension has yet to be fully elaborated, reports in the literature of satisfactory patient response to diuretics have long sanctioned their use. Mercurial diuretics have been prescribed by some physicians.⁹ In the present study, ammonium chloride was employed for its ability to promote diuresis through mild and well-controlled acidosis.

Sedatives have been employed in the treatment of premenstrual tension and will alleviate insomnia and nervousness.¹ However, such drugs aggravate rather than allay the mental bluntness, and the ability to concentrate becomes difficult.⁸ An antianxiety agent without influence on cortical function or the autonomic nervous system would appear preferable for the management of premenstrual tension.

Pennington,⁷ agreeing with this treatment ra-

tionale, has suggested use of meprobamate. This drug has in recent years found wide acceptance in treatment of anxiety-tension states regardless of etiology. It is believed to act on the thalamus and thus render daily stress situations more tolerable. In recommended doses, meprobamate is not known to produce tolerance or habituation. Side effects other than drowsiness are rare.¹⁰

It was felt that combined diuretic-meprobamate therapy would relieve the patient of physical symptoms provoked by water retention while alleviating the equally important anxiety-tension component.

REPORT OF CASES

Study Conditions. The unselected series was comprised of 100 white women aged 22 to 40 years. Of these, 86 per cent were 25 to 35 years old. Average patient age was 32.5 years.

All women had a past history of symptoms referable to premenstrual tension. These symptoms included overt anxiety and tension, headache, insomnia, irritability, temper tantrums and inexplicable crying spells, emotional instability, and/or inability to function efficiently in daily tasks or to partake in normal social activities.

In all women, symptoms were exacerbated throughout a seven- to ten-day interval preceding menses and abated thereafter. If gainfully employed, patients reported loss of one to ten days' work during this period. Housewives commonly spoke of "letting the cleaning go" until symptoms subsided.

Observation criteria were defined prior to the four-month study. Evaluation occurred twice in each month, first about ten days before menses and again one to three days before onset. At each visit, magnitude of anxiety and degree of emotional control were clinically appraised. Answers to a standard list of questions elicited patient ability to function at her daily work and to partake in social activities. Table 1 lists important observation criteria employed.

Purpose of the study was to compare patient response before and during meprobamate ther-

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TABLE 1
OBSERVATION CRITERIA

Degree of disorder	Response to stress (anxiety component)	Emotional control	Daily activities	Social activities
Normal	Well-adjusted	Well-adjusted	Efficient	Active social life
Approaching normalcy	Nervous	Irritable	Somewhat deficient in performing daily tasks	Inactive social life
Moderately abnormal	Easily upset, anxious, tense	Temper tantrums, temper outbursts	Unable to perform daily tasks efficiently	Socially ill-at-ease, withdrawn
Abnormal	Agitation, hostility	Fitful crying, emotionally unstable	Unable to perform daily tasks	Unable to face daily social situations

apy. Observations during the first month of diuretic treatment formed a baseline from which improvement, if any, was measured.

Drug regimen. All women received medication only during the ten days preceding onset of menses. Four drug regimens were employed:

1. Ammonium chloride alone was prescribed, 0.5 gm. twice daily, in the first month.

2. Ammonium chloride alone, 0.5 gm. twice daily, was given to 90 patients in the second month. The remaining 10 patients received 0.5 gm. of diuretic twice daily and 400 mg. of meprobamate three times daily in a preliminary trial.

3. Meprobamate, 400 mg. four times daily, was administered with 0.5 gm. of diuretic twice daily in the third month.

4. The fourth month, all received 0.5 gm. of ammonium chloride twice daily and 1 lactose tablet four times daily.

In months following, meprobamate and diuretic were continued without specific evaluation of patient response.

Prior therapy had included analgesics in all

eases and such sedatives as phenobarbital in most. Throughout the study, patients were reminded to avoid sedatives as well as table salt and sodium bicarbonate during meprobamate or diuretic therapy.

Results. Meprobamate in our series completely or virtually relieved overt symptoms of premenstrual tension in 86 of 100 women. Poor but perceptible response occurred in 8 patients. Six women did not respond (table 2).

Adequate emotional control was achieved by all women, whereas, before meprobamate therapy, 85 per cent had temper tantrums and outbursts of fitful and inappropriate crying.

Ability to function at daily activities improved substantially. Except for 1 patient, all women reported they were able to continue working during the ten days preceding menses. Participation in social activities improved but not dramatically.

A relationship between anxiety and emotional control could be anticipated and was observed. All patients in whom anxiety was well controlled also approached emotional stability.

TABLE 2
RESPONSE TO MEPROBAMATE-DIURETIC THERAPY IN 100 PATIENTS
WITH PREMENSTRUAL TENSION

	Response to stress (anxiety-tension component)		Emotional control		Daily activities		Social activities	
	Pre-therapy	Post-therapy	Pre-therapy	Post-therapy	Pre-therapy	Post-therapy	Pre-therapy	Post-therapy
Normal	0	41	0	33	0	13	0	2
Approaching normalcy	1	45	15	67	29	86	90	97
Moderately abnormal	37	8	81	0	70	1	10	1
Abnormal	62	6	4	0	1	0	0	0

Patient age did not influence response to any perceptible degree. No distinction existed between response in women aged 29 and younger and in those aged 30 and older.

On substitution of a placebo for meprobamate, anxiety and emotional instability reverted in most cases to levels observed prior to therapy. Five patients retained their moderately improved emotional tone and enhanced efficiency at daily routine.

In months following, on combined meprobamate-diuretic therapy, no evidence of tolerance appeared. The intermittent nature of treatment could have been expected to reveal any tendency toward dependency or habituation; however, neither condition could be discerned.

SIDE EFFECTS

Drowsiness was reported by 19 patients at least once during meprobamate therapy. Most often the phenomenon occurred after the second dose. In 15 of 19 patients, the drowsiness partially cleared within six days while therapy continued. In 4 patients, drowsiness disappeared completely in three to six days. Other side effects were absent. No correlation was found between drowsiness and degree of patient response.

COMMENT

Any investigation which evaluates subjective patient opinion is of questionable reliability. Indeed, subjective clinical appraisal is almost equally unreliable. Yet, patient response to pharmacologic agents, particularly those of psychotherapeutic activity, must often be described subjectively. Statistical analysis is even employed at times with justification to winnow significant facts from descriptions of response by patients.¹¹

Were more accurate methods of appraisal readily available, investigators would avoid acceptance of patient opinion and subjective clinical estimate. Such a lack of objectivity exists in the present study; hence, conclusions must be viewed as suggestive rather than definitive.

One conclusion that approaches objective truth relates meprobamate therapy to increased productivity in the women studied. Whereas 71 women admitted inability to carry out daily tasks efficiently before therapy, only 1 patient could not perform well while taking meprobamate. Of those gainfully employed, an estimated 1,200 work hours were lost monthly by 52 patients due to premenstrual tension; under meprobamate therapy, 1 patient could not work twenty-four hours. Such dramatic improvement in productivity lies beyond mere coincidence.

Unfortunately, other phases of the present

study permit no such conclusions. Relief of anxiety and tension, while dramatic, remains a clinical impression as does improvement in emotional tone.

However, response to placebo administration helps confirm the subjective impressions reached. Following withdrawal of meprobamate, every patient exhibiting a good or better response reverted to her original anxiety pattern and emotional status. This suggests that any decrease in premenstrual tension resulted from meprobamate rather than diuretic therapy or other factors.

In addition, the daily dose of 1.0 gm. of ammonium chloride found to promote diuresis is considerably less than that of 1.8 gm.³ and 3.0 gm.¹ recommended by other authors. From this too, one may imply that favorable response observed in our series resulted largely from meprobamate administration.

SUMMARY AND CONCLUSIONS

In 86 of 100 women with premenstrual tension, symptoms of psychosomatic origin were abolished or well controlled by 1,600 mg. of meprobamate given daily for ten days before onset of menses. On withdrawal of meprobamate from the drug regimen, anxiety and emotional tone reverted most often to deficient levels existing before therapy. Where gainfully employed women lost an estimated 1,200 work hours monthly before therapy, premenstrual tension caused loss of 24 hours' work during the month of meprobamate administration. Meprobamate is suggested in cases in which anxiety or emotional instability predominates in the premenstrual syndrome. A diuretic, such as ammonium chloride, will assist in restoring proper water balance and is valuable as a therapeutic adjunct.

Meprobamate (Equanil) was supplied for this study by Wyeth Laboratories, Inc., Philadelphia.

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Notes from a Medical Journey

Geneva, Switzerland
19 March 1959

Dear Jay:

Cynicism is the prevailing mood about international conferences on the political front but not in science and medicine where politics, at least of the governmental sort, are out. When we go off to a World Health Organization meeting to plan research programs, as I did last week, we really expect to accomplish something. We are all of one mind about health and disease and about understanding and harnessing nature for the common good of mankind, and there are no conflicting ideologies in such a meeting.

Yesterday we finished the sessions of the Scientific Group on Cardiovascular Diseases to advise the director general of WHO on research programs. I hope we did accomplish something, but, at this time, the outcome seems far short of preconference aspirations. This is normal, at least for me; an incurable optimism is bound to be disappointed in the immediate aftermath, especially when, as today, Lake Geneva is a leaden sheet under low clouds that obscure the surrounding Alps and the promise of spring seems to be forgotten. Still, the buds are swelling and anemones are thick in the woods, and I do not doubt that the vague generalities of our report will give way to more useful details some day.

The whole idea of research is relatively new to WHO, which, until lately, has been devoted to international cooperation in the application of established medical knowledge, particularly in communicable diseases. But that is not enough. Though governments may drag their feet, the peoples of the world demand a pooling of resources to tackle the big problems that dominate the health of today in the more developed countries and that of tomorrow in the underdeveloped countries.

This is a hasty trip. On the jet 'plane from New York, I had barely finished the after dinner coffee when it was orange juice and "What will you have for breakfast, Sir?" The longest spell of leisure was

waiting at London Airport for the 'plane for Copenhagen. I had 'phoned Copenhagen from Minneapolis, and, when I got there, I found Finnish and Swedish as well as Danish colleagues foregathered to discuss plans for collaborative research on heart disease, diet, and related matters. What I really wanted was sleep, but anyway we are now all set to start a long-term study in Finland in September, with five or more years of follow-up, on all men aged 40 to 59 in two rural areas, and the same plan, with only money needed, is fully developed for Italy and Yugoslavia. I expect Drs. Mollenbach and From Hansen will soon be ready with a program for Denmark, where the official mortality from coronary heart disease is low, though the hospitals are full of it. Perhaps the Danes are just tough, but their vital statistics embarrass me because they have a rather high-fat diet (but lower than ours). They do ride bicycles, which pleases Paul White.

In between things in Copenhagen, Dr. Martti Karvonen (Finland) and I saw Dr. Tybjaerg Hansen do a double heart puncture, one needle in the left auricle (via the suprasternal notch) and one in the left ventricle (anteriorlateral approach between the ribs). They have done several hundred of these now, all smooth and apparently easy. In the 35-year-old woman in question, the pressures showed clearly that her mitral commissurotomy, performed sometime ago, had done the job. The patient's vague complaints developing in recent months were put down as probably psychogenic.

In between things in Copenhagen and here in Geneva, I noted universal enthusiasm engendered by the newspaper reports of the "Health for Peace" bill in our Senate, sponsored by Lister Hill and our own Hubert Humphrey, plus 54 other senators. The peoples, as well as the doctors and medical scientists of the world, are eager to accept this kind of American leadership and imagination, even though the Russians may splutter that it is unnecessary for them. The suggested initial price, \$50,000,000 a year, could do wonders if properly administered. This is really a bargain basement opportunity for making friends and advancing medical knowledge. We must be grateful to Paul White and Howard Rusk as well as to Senators Hill, Humphrey, and the rest who have labored to develop the idea.

This fits in with the new look toward research of WHO, of course, though how it will all mesh in terms of operations remains to be seen. WHO has had many limitations in its first ten years of life, and it is still woefully short of staff and experience in the research field. Now there will be committees and boards, memoranda and reports, and all sorts of tiresome but necessary bureaucratic maneuvers before real things happen, even after (and if!) Congress passes the bill.

Naturally, I hope the end result will make it more readily possible to proceed with our master plan for studies on the development of heart disease in a dozen cohorts of men representing population contrasts in the frequency of heart disease and the mode of life. Tonight I fly to Rome where our Italian and Yugoslav colleagues will be ready with plans and preliminary data on the populations sampled in the last eighteen

months. I already know we can count on magnificent cooperation from the populations (96 to 99 per cent of all men responding) as well as enthusiastic collaboration from the professional groups involved.

Before leaving home, Henry Blackburn, Ernst Simonson, and others checked and rechecked the 12-lead electrocardiograms, before and after an exercise test, on 1,054 men aged 45 to 59 in our two areas of study in Yugoslavia (98 per cent of all men of the age, sick or well, in the areas). They found a total of 12 probable or possible old myocardial infarctions. This is something like one-third the frequency of such findings on the men of that age in active service in the U. S. railroads now being studied by Henry Taylor. Much the same discrepancy holds for ST and T changes. We are all anxious to see what happens to the men with ST and T abnormalities in all of these series. The follow-up program we hope for would give the answer.

And so to Rome, and sunshine I hope, but alas! for only 2 days, and I shall miss Easter Sunday there, with the great throng in St. Peter's Square and the fashionable parade and sidewalk tables on Via Veneto and a thousand bells ringing.

As ever,

A handwritten signature in cursive script, reading "Ancel Keys". The signature is written in dark ink and is positioned below the text "As ever,".



A. A. Pleyte, M.D.

A Personal Appreciation

HAROLD HOLAND

Milwaukee, Wisconsin

THE RETIREMENT on January 1, 1958, of Dr. A. A. Pleyte as medical director of the Wisconsin Anti-Tuberculosis Association capped a career in tuberculosis medicine spanning almost forty-five years and embracing almost every phase of tuberculosis work. Dr. Pleyte's experience includes sanatorium clinical service, Veterans Administration work, sanatorium consultation, work in traveling clinics, and professional and public educational programs.

Dr. Pleyte's induction into tuberculosis came shortly after winning his medical degree at the School of Medicine of Marquette University in 1913. At the age of 22, he became a junior physician at the Wisconsin State Sanatorium at Wales in southern Wisconsin. Here he had intensive clinical experience under the late Dr. J. W. Coon, one of the early and great sanatorium physicians of the state.

Becoming assistant superintendent, he resigned in 1917 to enter private practice at Delafield, Wisconsin. A period in the Army Medical Corps in 1918 and 1919 was largely spent at the Veterans Administration Hospital at Öteen, North Carolina, where he worked as an associate of Dr. Henry Kennon Dinnahan, known for his outstanding work in developing the chest x-ray film for differential diagnosis and in studying the progression of the tuberculous process.

Returning to Wisconsin and his private practice at Delafield, Dr. Pleyte was drawn into the traveling clinic work being launched by the Wisconsin Anti-Tuberculosis Association in the summer of 1919. There being but one full-time physician on the medical staff of the association, Dr. Pleyte was one of many physicians in general practice who were called upon to assist in the rapidly growing clinic activities. So fast did the demand for these clinics

grow that Dr. Pleyte was asked to join the staff and did so on May 1, 1920, as a full-time physician.

Thereafter, for nearly thirty-eight years, the life of Dr. Pleyte was essentially the story of the association's remarkable clinic and medical educational program.

For ten years, these clinics were largely based upon stethoscopic findings supplemented by taking careful medical social histories and sputum tests and by referring suspicious cases to sanatoriums for observation and study. In these ten years, well over 100,000 clinic examinations were made in the association's traveling chest clinics, and no Wisconsin Anti-Tuberculosis Association physician is believed to have done as many as Dr. Pleyte.

These stethoscopic clinics were noteworthy in several respects. They uncovered a tremendous amount of unknown and unsuspected tuberculosis, even through the relatively crude diagnostic tools available. They wiped out sanatorium vacancies, common in Wisconsin after World War I, and built up waiting lists, even with continued expansion of sanatorium bed capacities. They demonstrated the need for special diagnostic services in industries and vocational schools. They also revealed a large unknown, and even unsuspected, reservoir of heart disease among young and apparently healthy individuals. And, they showed that such clinics could be carried on in local communities in a way to win the respect and applause of physicians in local practice.

Thus, the incoming president of the State Medical Society of Wisconsin, Dr. Rock Sleyster, who later became president of the American Medical Association, wrote in 1923 to the medical department of the Wisconsin Anti-Tuberculosis Association:

"No feature of our 1923 meeting made a greater impression on me than the frequency and the enthusiasm of the reports which came in from all parts of the State on the value to the medical profession, as well as to the community, of the Traveling Free Chest Clinics conducted by your organization."

Some ten years of this cruelly hard clinic work—requiring working days that frequently lasted from 9 in the morning until 9 at night, with hurried meals, wretched hotel rooms in small towns, and train changes at all hours of the night—demonstrated something else, however: that a better diagnostic procedure was necessary to find early tuberculosis.

This recognition led to the experimental use of the Mantoux tuberculin skin test by the association in 1927, and as a routine phase of its program from 1931 on. Early testing was done in institutions caring for children, then in high schools, and then among grade school children. Like other Wisconsin Anti-Tuberculosis Association physicians, Dr. Pleyte became enthusiastic about both the diagnostic and educational possibilities of the tuberculin skin test. When other tuberculosis associations and health departments forsook the tuberculin skin test, in the wave of enthusiasm generated for mass x-ray surveys in the 1940's, Dr. Pleyte and his medical associates clung to their faith in the skin test.

Nevertheless, as new diagnostic procedures showed feasibility in traveling clinic work, the Wisconsin Anti-Tuberculosis Association medical department quickly adapted them to its program.

Thus, a traveling fluoroscopic x-ray bus was put on the road in 1937, one of the first such in the country. This was followed by a mobile photofluorographic unit in 1941, reputed to be the first put in operation by any state tuberculosis association.

In addition to reading tens of thousands of films taken in the association's mobile x-ray clinics and giving and reading thousands of tuberculin skin tests, Dr. Pleyte was called upon to read thousands of films sent to the association by private physicians all over the state.

At the same time, Dr. Pleyte carried a heavy load in four other areas. One was in the field of sanatorium consultation, a service developed by the Wisconsin Anti-Tuberculosis Association early in the 1920's. Dr. Pleyte's consultation and counsel were immediately in demand. At one time or another, he has served as a medical consultant to almost all of the twenty-odd tuberculosis hospitals of the state.

Simultaneously, he was frequently called upon to speak on medical topics before county medical societies and other professional groups and before lay audiences. These talks usually came at the close of the long day of examinations.

"We remember," one sanatorium superintendent wrote on Dr. Pleyte's retirement, "how, after your day's consultation service at the sanatorium, many times there would be an evening appointment for a speaking engagement at a local anti-tuberculosis as-

sociation meeting in one of the small towns in the surrounding territory or a lecture on tuberculosis for the student nurses at the local hospital. To borrow from an old motto, 'neither rain, sleet, snow, nor the dark of night could stay you from these appointed tasks.'"

A third area of increasing demands was in the administrative direction of the association's medical and clinical program. In 1939, Dr. Pleyte became head of the association's medical department, with administrative responsibilities for a staff embracing several physicians, nurses, x-ray technicians, and clerical workers as well as general supervision of the health status of employees in all of the association's many divisions.

Twelve years later, he was named to the newly created post of medical director of the association, a position directly answerable to the board of directors, with over-all responsibility for developing and carrying out medical policy.

A fourth area of responsibility was in organizing and guiding various types of graduate medical education in the field of chest diseases, such as institutes and seminars for practicing physicians. Closely allied was the responsibility for the annual Dearholt Days lecture before the faculty and students of the University of Wisconsin and Marquette University medical schools, established in memory of the association's founder, the late Dr. Hoyt E. Dearholt, through which many distinguished speakers have been brought to these two schools.

Meantime, Dr. Pleyte had frequently been called upon for active participation in medical organization work. He was secretary of the Mississippi Valley Sanatorium Association (now called the Mississippi Valley Trudeau Society) from 1929 to 1933 and president from 1933 to 1934. He was president of the Wisconsin Trudeau Society from 1946 to 1948. He has also served as a member and chairman (1947) of the Committee on Health Education of the American Trudeau Society and the committee on tuberculosis and chest diseases of the Wisconsin State Medical and Milwaukee County Medical societies.

Dr. Pleyte is the author of many articles on scientific and popular phases of tuberculosis control in *The Journal-Lancet*, *Wisconsin Medical Journal*, *Wisconsin Journal of Education*, and other periodicals. One article, in the December 1957 issue of *Today's Health*, lay health journal of the American Medical Association, is on the subject of "Tuberculin Tests, a Key in the Conquest of Tuberculosis." Another, appearing in the *Journal of School Health and Diseases of the Chest*, reviews thirty years of tuberculin testing experience in Wisconsin.

Dr. Pleyte holds certification by the American Board of Internal Medicine in the specialty of internal medicine and tuberculosis. He is a member of the American Medical Association; the Wisconsin State and Milwaukee County Medical societies; the American, Mississippi Valley, and Wisconsin Tru-

dean societies; American College of Physicians; American Public Health Association; Wisconsin Society of Internal Medicine; and Wisconsin Association for Public Health. He is also a member of the Milwaukee Internists' Club and a member and past president of the Milwaukee chapter of his medical fraternity, Alpha Mu Phi Omega.

Dr. Pleyte was married immediately upon completing his internship to Esther C. Wiens of Milwaukee. The Pleytes have two daughters, Mrs. Allen D. Everitt and Mrs. William D. Van Derslice, both of Milwaukee.

Dr. Pleyte's long and distinguished service to the cause of tuberculosis control was recognized by his co-workers in other states in the award to him of the Dearholt Medal at the Mississippi Valley Conference on Tuberculosis at Dayton, Ohio, October 16, 1958. Presenting the award, Dr. J. B. Stocklen, Cleveland, Ohio, 1957 winner, said:

"Quietly and persistently, without bombast, but effectively he has pursued his task until today the state which he represents is acclaimed by all for its splendid achievements in the field of tuberculosis control."

Our Nuclear Adventure: Its Possibilities and Perils, by D. G. ARNOTT, 1958. New York: Philosophical Library, Inc., 166 pages. \$6.00.

In this monograph is presented a timely, lucid, and interesting account of the important role of nuclear power on our lives and the increasing importance of its role on the lives of future generations. For the uninitiated, the introductory chapters, which deal with the physical principles underlying the production and utilization of nuclear energy, provide the necessary background for understanding the remainder of the book. The reader well grounded in the physics of the atom will be able to bypass this section or peruse it lightly.

Once the reader has the basic information at hand, he is quite certain to be intrigued by the author's factual presentation of the worldwide problems associated with radiation hazards following the explosion of fission and fission bombs and in the disposal of radioactive waste materials resulting from the production of nuclear power.

Philosophical, political, social, and moral problems allied with the testing of nuclear weapons and the associated radioactive fallout are discussed in considerable detail. Except for the political issue, these problems are discussed quite objectively and without bias. It is likely, however, that many readers, especially those living in the United States, will disagree with Dr. Arnett's political views. This may deter from an appreciation of an otherwise well documented account of *Our Nuclear Adventure*.

The pages of this book devoted to the immediate economic importance of the development of nuclear power, the comparison of its cost



to more conventional sources of power, and its effect on the educational standards necessary to properly develop and use nuclear power are especially interesting.

This book is recommended to all who are interested in the "possibilities and perils" of the atomic age.

MERLE K. LOKEN, Ph.D.

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Hermaphroditism, Genital Anomalies and Related Endocrine Disorders by HOWARD W. JONES, JR., M.D., and WILLIAM W. SCOTT, M.D., 1958. Baltimore: Williams & Wilkins Co., 456 pages, illustrated, \$16.00.

Today it is becoming more and more clear that tumors of the adrenal glands, ovaries, or testicle can produce remarkable changes in the sexual make-up of a person. We physicians still have very little information about these troubles. For instance, the average physician may never have heard of Klinefelter's syndrome, a disease which, in middle age, changes the appearance of a man so that he looks very much like a woman with large breasts. Now that women are being given large doses of powerful progesterones or androgens designed to stop an impending miscarriage, quite a few children are being born with their genitalia malformed. Hence, there

is an increasing need for directors of hospitals to learn that they must not look upon these unfortunate people as obscene criminals who deserve no sympathy or help. They are patients, and, like other patients, some need surgical help. Today, in many hospitals, the doctors are not allowed to perform the necessary operations. How wonderful it would be if all directors on hospital boards could read this splendid book. It is well written and well documented and is based on the description of scores of cases. It is beautifully illustrated and should for years be an authoritative text on the subject.

WALTER C. ALVAREZ, M.D.

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Essentials of Gynecology, by E. STEWART TAYLOR, M.D., 1958. Philadelphia: Lea and Febiger, 502 pages, illustrated. \$12.00.

This book, in a field already well represented, has as its stated purpose "to meet the need of undergraduate medical students and young practitioners of gynecology." The presentation is straightforward and, in the opinion of this reviewer, succeeds in accomplishing its objective.

The subject material is covered in conventional chapter style beginning with chapters on office laboratory examinations and preventive medicine. Next are good, though brief, sections on anatomy and physiology. Thereafter in logical anatomic order are the usual subjects dealing with gynecologic pathology. The balance of the book, nearly one-half, is devoted to: gynecologic surgery, gynecologic endocrine problems, the menopause, infertility, pediatric gynecology, primary dysmenorrhea, and uterine displacements. Perhaps one may be critical of inclusion and seemingly relative overemphasis in

(Continued on page 18A)

Foreword

Since there are few malignant conditions that are not associated with pain, it would seem that a discussion or a review of the management of malignant tumors could well be presented in the Section on Pain. The article, "A Critical Review of the Management of Soft-Tissue Sarcomas," by R. Lee Clark, Jr., M.D., Richard G. Martin, M.D., and E. C. White, M.D., is presented here because of the experience and authority that stand behind the authors. The article is interesting and informative, and I am sure that the reader will be glad to have read it.

JOHN S. LUNDY, M.D.

A Critical Review of the Management of Soft-Tissue Sarcomas

R. LEE CLARK, JR., M.D., RICHARD G. MARTIN, M.D.,
and E. C. WHITE, M.D.

Houston, Texas

IN ORDER TO treat a patient adequately, the etiology of his disease should be known. Like that of other neoplastic diseases, the etiology of the soft-tissue sarcomas remains unsolved. The next best criterion upon which to base the treatment is a sound understanding of its natural behavior both as a pathologic entity and in its relationship with the host.

Less than 1 per cent of all tumors observed at the University of Texas M. D. Anderson Hospital and Tumor Institute are soft-tissue sarcomas. Considering the large amount of tissue of mesenchymal origin in the body, this is indeed a low incidence. Could the fact that these tissues are not subjected to external irritation, as are the skin and mouth and gastrointestinal, respiratory, and genitourinary tracts, and to the fluctuations caused by the endocrine system, as are the thyroid and breast, have any bearing upon this low incidence? A history of trauma has often been associated with the development of these tumors,

although it has not been proved a factor. An occasional lesion is believed to be induced by irradiation.

Approximately 73 per cent of the soft-tissue sarcomas observed in this hospital arose in the extremities, two-thirds of these being in the lower extremities. The remainder, in decreasing numbers, developed on the trunk, head, and neck areas and in the retroperitoneum.

Persons of any age may have soft-tissue sarcomas. The incidence was slightly higher in our patients between 30 and 50 years of age. The youngest patient was 3 months old when the tumor, which had been present since birth, was first observed. The five-year survival rate is related less to the age of the patient than to the microscopic character of the tumor.

The presenting sign is a "lump" or nodule in the superficial or deep soft tissues. The deeper lesions are usually larger when first detected. As a rule, pain is not associated unless a nerve is involved. A nodule which appears in the soft tissues of the extremities or trunk, head, and neck regions should be regarded with no less suspicion than one in a breast.

Grossly, these tumors often appear encapsulated. They have only a pseudocapsule, however, consisting of layers of flattened tumor cells with cleavage planes between the layers. Thus, enucleation will inevitably leave viable malignant cells in the area, giving rise to their re-

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growth. Not all have a "pseudocapsule." In many of the more malignant types and the lower grade desmoid tumors, direct extension can be seen grossly and microscopically in apparently normal areas.

The concept that sarcomas metastasize only by way of the blood stream has been abandoned since metastasis via the lymph channels has been widely reported. This was the mode of spread in 6 of our cases, including synovial sarcomas, liposarcomas, rhabdomyosarcomas, and unclassified sarcomas. Lymph node metastasis of synovial sarcomas is particularly common, while fibrosarcomas are least likely to metastasize through the lymphatic system. In view of the high incidence of metastasis via the blood stream, the lung is most often the first organ to be invaded. Since the lesions are multiple in both lung fields, palliative lobectomies or pneumonectomies usually are not feasible. In treating patients with carcinomas of the head and neck in this institution, it has been found that these tumors frequently spread along the nerves. For this reason, all nerves leading from the area of the sarcoma are now examined routinely at operation. Thus far, this route of extension has been found in 3 cases, 1 on clinical observation and the others on microscopic section. A patient with fibrosarcoma of the chest wall and microscopic evidence of metastasis via the intercostal nerves died from compression of the spinal cord and complete paralysis below the waist seven months after radical excision. Every possible method, including radiography of the chest and bones and liver function tests, is employed in an attempt to rule out metastatic lesions before treatment for the primary lesions is instituted.

If not removed, soft-tissue sarcomas tend to grow to a large size and frequently become ulcerated, hemorrhagic, and infected. Patients with such lesions suffer severe pain, are often bed-ridden, and may require radical surgical treatment for palliation. If operation is indicated, it should be preceded by an adequate biopsy and histologic confirmation of the diagnosis. Ideally, the biopsy specimen should be removed and examined by frozen section. If a diagnosis of sarcoma is reported, a definitive operation should be carried out immediately. If the pathologist cannot make a definite diagnosis of malignant disease from frozen sections, permanent sections should be examined, and, if necessary, the opinion of several pathologists should be obtained before operation is undertaken.

The best method of biopsy is complete ex-

cision of the lesion. However, if the lesion is large or deeply located, this is obviously impossible; the specimen is then obtained by aspiration or incision. The incision biopsy is usually preferred by pathologists. In view of the radical nature of the treatment, an ample amount of tissue should be removed for examination.

Superficial lesions, especially low-grade fibrosarcomas, desmoid tumors, and dermatofibrosarcomas, require wide excision. Deeper lesions, either between or within muscle groups, require removal of the entire muscle bundles from their origins to their insertions. Adequate radical excisions are difficult to accomplish in the head and neck area, trunk and retroperitoneum, yet this is one's only recourse. Often, large areas of the abdominal or chest wall with the accompanying ribs must be removed. The repair of the resulting defect may be difficult, calling for considerable ingenuity on the part of the surgeon. Usually, a full thickness pedicle flap must be elevated to cover the defect, or perhaps some prosthetic material, such as tantalum wire mesh or plastic, must be employed. Wide excision of retroperitoneal lesions generally necessitates resection of part of the intestine, a kidney, or the spleen.

Amputations are reserved for tumors which cannot be removed because of involvement of vital structures or their location near a joint. Unfortunately, the large nerves and blood vessels supplying the extremities lie in the planes between the muscle bundles and, at times, must be sacrificed. If, in consequence, the limb will become useless, amputation is indicated.

Amputation is carried out above the origin or insertion of the involved muscle groups. In every case, the nerve endings are examined for metastases. If the lesion is located adjacent to a lymphatic drainage area, an en bloc lymph node dissection is performed, if feasible, especially in the presence of a synovial sarcoma. Disarticulation of the hip should be accompanied by an iliac node dissection. The more deforming hemipelvectomy and intrascapulothoracic amputations are performed only when the lesions are so located that no other surgical procedure will suffice. In this group are tumors of the upper thigh, upper arm, hip, buttocks, and shoulder. Those of the buttocks, if not too large, may lend themselves well to a block dissection of the gluteal muscles, though, for large or recurrent lesions, hemipelvectomy usually is necessary.

Since most soft tissue sarcomas are radioresistant, roentgen therapy as a definitive treatment

TABLE 1
CHEMOTHERAPEUTIC AGENTS USED IN TREATMENT OF PATIENTS
WITH SOFT TISSUE SARCOMAS

<i>Agents</i>	<i>Anatomic Site</i>	<i>Histologic diagnosis</i>	<i>Number of cases</i>	<i>Dosage and Route of administration</i>	<i>Results</i>
ALKALATING:					
Nitromin	Extremities	Fibrosarcoma, Unclassified,	4	I.V., 350 to 1,500 mg. over 30-day period	Negative to minimal regression in all but 2 patients. The first with fibrosarcoma of trunk had marked regression with 175 mg. of PAM I.V. in divided doses. The second patient with lymphangiosarcoma following radical mastectomy had clinically complete regression after perfusion with 50 mg. of PAM and 10 mg. of HN2. Two foci found in amputated arm.
Nitrogen mustard	Trunk	Liposarcoma,	7	Perfusion, 10 to 50 mg. I.V., 10 to 20 mg.	
	Buttock	Angiosarcoma, Synovial sarcoma, Lymphangio-			
Phenylalanine mustard	Head	sarcoma, Postrad.	7	Orally, 20 mg. Perfusion, 50 to 100 mg. I.V., 20 to 50 mg.	
		mastectomy, Rhabdomyo-			
ThioTepa		sarcoma	1	Injected into tumor 8 mg. \times 2	
ANTIMETABOLITE:					
Amethopterin	Head	Rhabdomyo-	1	I.V., 2.5 mg. \times 8	No objective regression
	Buttock	sarcoma, Angiosarcoma	1	I.V., 2.5 mg. \times 14	
ANTIBIOTIC:					
Actinomycin-D	Trunk	Fibrosarcoma,	5	I.V. in divided doses totaling 250 to 5,500 gamma	Temporary regression in case of rhabdomyosarcoma given Actinomycin-D. 950 gamma given I.V. prophylactically to 16-month-old child after radical wide excision of lesion of arm.
	Extremity	Angiosarcoma,			
Carzinophilin	Head	Rhabdomyo-	2	105,000 units total dose I.V. over 3-wk. period	
	Buttock	sarcoma			
STEROID:					
Cortisone				15 mg. every 5 hours \times 5	Used in some cases with HN2 in an attempt to potentiate the action of HN2. Unable to evaluate.
Combination of above agents		In several cases, more than one agent has been tried.			No added benefit

or in conjunction with surgical treatment is not used except for Kaposi's sarcoma. Irradiation may control a local Kaposi's sarcoma, although it does not cure the patient. In some cases, this mode of therapy alleviates pain from bone metastasis or controls hemorrhage from large, ulcerating lesions. It has been reported that liposarcomas also respond to roentgen therapy. In this institution, irradiation of retroperitoneal liposarcomas has been tried with little success.

At present, chemotherapeutic drugs are being extensively studied with regard to their effects upon the various forms of malignant disease. Thus far, the studies have been directed chiefly to the lymphomas, melanomas, carcinomas, and, to a lesser extent, to connective tissue sarcomas, since lesions most sensitive to irradiation seem to respond best to chemotherapy. The drugs under investigation in this institution fall into 4 groups: (1) the alkalating agents, (2) the antimetabolites, (3) the highly toxic antibiotics, and (4) the steroid hormones. They have been administered orally, intravenously into the general

circulation, and by perfusion of an isolated area with use of the extracorporeal pump oxygenator. The principal drugs used are shown in table 1.

Thus far, none have been particularly successful. At times, a temporary regression of the tumor and relief of the patient's discomfort is observed, though the period of survival does not appear to have been prolonged. Unfortunately, these agents produce severe, toxic side reactions, that is, bone marrow depression, nausea, vomiting, and diarrhea. Intravenous administration is followed by less nausea and vomiting and permits better control of the dosage.

Chemotherapy is still in the experimental stage; it is used only infrequently as a prophylactic measure. The ideal treatment, of course, would be complete excision of the primary lesion and control or prevention of metastasis with some drug. Theoretically, this appears feasible. If a tumor can be largely or completely destroyed with a chemical agent, this drug should also destroy single tumor cells or small clumps of cells floating in the peripheral blood stream

TABLE 2
LOCAL RECURRENCE RATE OF SOFT TISSUE SARCOMAS

Procedure	Total number of procedures	One recurrence	Multiple recurrences	Total recurrences
Local excision	102	45	27	72 (70.6%)
Local excision followed by radical excision	55	6	—	6 (9%)
Radical excision only	35	3	—	3
No surgical treatment (inoperable or refused surgery)	20	—	—	—

or lying dormant in any of the body tissues. It has been shown, however, that following perfusion with large doses of these agents in an isolated extremity, the tumor mass sloughs off, though viable cells tend to remain at the periphery of the lesion where the concentration is highest because of the more abundant blood supply. We must conclude, therefore, that, at present, no drug is available which is both safe and reliable as a treatment for connective tissue sarcomas.

SUMMARY

From January 1944 to January 1959, 169 patients with soft-tissue sarcomas were observed at the

University of Texas M. D. Anderson Hospital and Tumor Institute. The tumors were of the following types: fibrosarcoma, including the neurofibrosarcomas and desmoid tumors; liposarcoma; synovial sarcoma; rhabdomyosarcoma; leiomyosarcoma; angiosarcoma, including Kaposi's sarcoma; myxosarcoma; and unclassified sarcoma.

As stated previously, radiation therapy for these lesions, with the exception of localized Kaposi's disease, has proved ineffective.

From table 1 it is apparent that, in general, the results of chemotherapy have been disappointing. In the case of lymphangiosarcoma, which developed in an edematous arm subse-

TABLE 3
SURVIVAL RATE—SARCOMAS OF THE SOFT TISSUES

Year of diagnosis	Total cases	Total traced	Patients alive year of diagnosis	1 yr.	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1938	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	—	—
1942	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1944	2	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1945	2	2	1	1	1	1	1	1	1	1	1	—	—	—	—	—	—	—	—
1946	2	2	2	1	1	1	1	—	—	—	—	—	—	—	—	—	—	—	—
1947	2	2	2	1	1	1	1	1	1	1	1	1	1	1	—	—	—	—	—
1948	10	10	10	9	8	5	4	4	3	2	2	2	2	—	—	—	—	—	—
1949	7	7	6	4	4	4	3	2	2	2	2	2	—	—	—	—	—	—	—
1950	16	16	16	13	11	10	10	10	10	10	10	—	—	—	—	—	—	—	—
1951	11	11	9	8	8	8	7	7	7	6	—	—	—	—	—	—	—	—	—
1952	23	23	22	16	15	11	9	8	8	—	—	—	—	—	—	—	—	—	—
1953	17	17	14	12	11	9	8	8	—	—	—	—	—	—	—	—	—	—	—
1954	22	22	22	18	16	13	12	—	—	—	—	—	—	—	—	—	—	—	—
1955	13	13	13	11	8	7	—	—	—	—	—	—	—	—	—	—	—	—	—
1956	13	13	12	10	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1957	15	15	14	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1958	12	12	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	169	169																	

Surviving 5 years (43 of 94 patients, 1938 to 1953) = 45.7%

quent to radical mastectomy, the pronounced regression of the tumor following perfusion with phenylalanine mustard might have been obtained also with irradiation, since these lesions, like Kaposi's disease, are believed to respond to such treatment. Although no reliable and safe drug is available at this time, chemotherapy alone or in conjunction with surgical treatment may hold the answer to the control or prevention of metastasis from soft-tissue sarcomas. For this reason, experimentation along these lines is to be continued.

At present, excision must be considered the treatment of choice for soft-tissue tumors. As revealed in table 2, following local excision, local recurrence may be expected in approximately 70 per cent of the cases, whereas, after radical operation, whether wide excision or amputation, the local recurrence rate is approximately 9 per cent. Local recurrence after operation appeared at the sites of primary lesions in the head and neck area; trunk and retroperitoneum, where adequate radical excision was impossible; and at the sites of primary lesions of the extremities, which were excised locally only because the patients refused an adequate radical operation, such as amputation. Because of the likelihood of local recurrence, patients who have had a local excision elsewhere are treated by wide excision of the area, even though no recurrent lesion can be elicited clinically. Minute foci of tumor have been found in 3 of the last 4 such cases.

It is believed that, with few exceptions, adequate and well-executed excision will control the primary lesion. Each patient must be carefully evaluated as to the site, nature, and extent of the lesion, and an operation must be performed which conforms to these factors. Cure, of course, depends upon successful local removal of the tumor before it has disseminated. If the tumor

is eliminated entirely, including the structure of its origin, its contiguous muscle bundles, fascia, periosteum, and skin, local control of the disease can be assured in approximately 90 per cent of the patients. Even though metastasis is present, excision of the primary lesion is worthwhile to prevent continued dissemination from this source and to permit better control of pain, disability, and infection accompanying the late stages of the disease.

On the whole, the five-year survival rate of the patients in this series was approximately 45.7 per cent, regardless of the classification or grading (table 3).

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Book Reviews on Pain

HOSPITAL PLANNING FOR THE ANESTHESIOLOGIST, by WILLIAM H. L. DORNETTE, M.D., professor of anesthesiology and head of the department, University of Tennessee College of Medicine, Memphis; anesthesiologist-in-chief, The John Gaston Hospital, 1958. Springfield, Illinois: Charles C. Thomas, 119 pages. \$5.25.

This unusual book calls attention to the desirability of having one person on the medical staff of a hospital who lives most of every day at the hospital and is able to point out how a hospital should be laid out so that it will function appropriately. It has been said that if a building is designed for a certain purpose and if the design makes it possible to accomplish that purpose more easily and more simply, the design is good; on the other hand, if the user has to change his procedure to fit the design, the design is not good. The author has covered a variety of general and special considerations.

The book contains a small bibliography and an index. It is printed on good paper and is easily read. It will prove helpful to those who design and use hospitals.

JOHN S. LUNDY, M.D.

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MODERN TRENDS IN ANESTHESIA, by FRANKIS T. EVANS, M.B., B.S., F.F.A.R.C.S., D.A., and T. CECIL GRAY, M.D., F.F.A.R.C.S., 1958. New York: Paul B. Hoeber, Inc., 318 pages, 30 illustrations, and 22 tables. Cloth. \$15.00.

This book embodies the results of the experience and knowledge of 22 authors from England, Canada, Sweden, and the United States. The material is impressive and the authors speak with considerable authority. The text is up-to-date and discusses the latest drugs and the techniques for all of the current methods of anesthesia, including inhalation, intravenous, regional, and local. The volume can be read to advantage by anybody interested in anesthesia.

The subject matter covers a wide range. Dr. W. D. M. Paton, professor of pharmacology, Royal College of Surgeons, writes on the muscle-relaxant drugs; Dr. J. W. Dundee, lecturer in anesthetics, Queen's University, Belfast, on the pharmacology of the new anesthetic agents; Dr. W. G. Walter, director of the Physiological Department, Burden Neurological Institute, Bristol, on the physiology of consciousness and sleep; Dr. John Beard, lecturer on anesthesia, Post-Graduate Medical School, London, on analgesic and sedative drugs; Dr. I. C. Geddes, lecturer in anesthesia, University of Liverpool, on local anesthetic drugs; Dr. John J. Bönica, University of Washington, Seattle, on regional anesthesia; Dr. A. B. Dobkin, associate professor of anesthesia, University of Saskatchewan, on pulmonary ventilation in relation to anesthesia; Dr. R. P. Harbord, University of Leeds, on the effects of surgical trauma and the effects of anesthetics on the circulation; Dr. T. Cecil Gray, University of Liverpool, on hypothermia; Mr. Denis Melrose, lecturer in surgery, Post-Graduate Medical School, London, on extracorporeal circulation; Dr. Hilda Roberts, Women's College Hospital, Toronto, on obstetrical analgesia and anesthesia; Dr. G. Jackson Rees, honorary lecturer in pediatric anesthesia, University of Liverpool, on pediatric anesthesia; Dr. E. F. Scowen, St. Bartholomew's

Hospital, London, on the adrenal glands in relation to anesthesia; Dr. J. B. Wyman, consultant in anesthesia, Westminster and Woolwich Memorial Hospitals, London, on induced hypotension; Dr. H. J. V. Morton, senior anesthetist, Hillingdon Hospital, Middlesex, on anesthetic mortalities; Mr. A. A. Mason, clinical assistant, Psychiatric Department, West London Hospital, on hypnosis; Mr. O. P. Dimick, consultant in anesthesia, Middlesex Hospital, London, on the anesthetic problems posed by intercurrent diseases; Mr. Patrick Shackleton, consultant in anesthesia, Southampton Hospitals, on impaired respiratory function; and Mr. B. G. B. Lucas, anesthetist, University College Hospital, London, on anoxia.

Anesthesia research in England is commented upon by Mr. Ronald Woolmer, director of the Research Department of Anesthetics, Royal College of Surgeons of England; in Scandinavia by Eric Nilsson, chief anesthetist, University Hospital, Lund; and in the United States by Dr. E. M. Papper, director of the Anesthesiology Service, Presbyterian Hospital, New York City.

The book was printed in England on good paper. It is easily read and is indexed. The price of this book may seem high, but for those who wish a handsomely prepared volume on current methods and means in anesthesiology, the price is not excessive.

JOHN S. LUNDY, M.D.

•
FUNDAMENTALS OF GENERAL ANESTHESIA FOR STUDENTS AND PRACTITIONERS OF DENTISTRY, by JOHN ADRIANI, M.D., professor of general anesthesia, School of Dentistry, Loyola University; professor of surgery, School of Medicine, Tulane University; clinical professor of surgery and pharmacology, School of Medicine, Louisiana State University; director, Department of Anesthesia, Charity Hospital, New Orleans, Louisiana, 1959. Springfield, Illinois: Charles C. Thomas, 213 pages.

The keen interest in and desire for information about anesthesia on the part of members of the dental profession have come to be very real. Hence, the appearance of this book at this time satisfies a need which had not existed to the extent it does today. The volume goes far to serve this current interest among dentists in that it covers the fundamentals of general anesthesia for students and practitioners of dentistry as well as the nature of anesthetic agents and allied drugs and the physiologic aspects of anesthesia. There is a chapter on the administration of anesthetic agents by means of various devices and chapters on gaseous and liquid anesthetic agents, nonvolatile drugs, barbiturates, narcotic drugs and sterols, and drugs used as muscle relaxants. Another chapter discusses the basic clinical principles of office anesthesia. Intratracheal anesthesia is discussed, as is resuscitation, including a part on cardiac arrest. There is a chapter on the complications of anesthesia, one on operating-room deaths, and one on the systemic effects of local anesthetic agents.

The book is indexed, printed on good paper, and is easily read. Although it is directed primarily to dentists, anyone who is interested in anesthesia should read it.

JOHN S. LUNDY, M.D.

Current Literature on Pain

HALOTHANE ('FLUOTHAN') IN A COUNTRY HOSPITAL, by T. A. BROWN and M. A. WOODS: *Brit. J. Anaesth.* 30:333-337, 1958.

"The pioneers of halothane proved to their own satisfaction that a deep narcosis free from toxic after-effects, explosion risks, and cardiac catastrophe could be obtained with this drug. We decided in July 1957 to attempt to duplicate their results in the theatres of the North Down Hospitals Group. The group includes Ards Hospital . . . and Bangor Hospital, a converted cottage hospital . . . The work done . . . is a fair sample of general anaesthetic practice. . . .

"Halothane has been used in nearly every case anaesthetized by the writers for more than seven months. About 1,361 operations have been done, the ages of the patients varying from a few days to more than 90 years and their conditions from the robustly healthy to the almost moribund. Considering this experience, we know of no other anaesthetic or combination of anaesthetics which can give results so acceptable to the three individuals principally concerned in a surgical operation.

"The patient has a quick easy induction, a safe anaesthesia, and a quick recovery with few unpleasant after-effects. The surgeon has a pink, spontaneously breathing patient who is well relaxed, shock resistant, and less haemorrhagic than usual. The anaesthetist is possibly the most satisfied of the three. He has the pharmacological effects of only one drug to consider and can control the depth of anaesthesia almost from breath to breath to meet the needs either of the surgeon or the patient. Above all, he is absolved from the necessity of watching the condition of his patient slowly deteriorate under the combined attack of surgical shock and long acting narcotics in spite of every available supportive measure.

"Economically, when closed circuit technique is employed, the saving effected in nitrous oxide, oxygen, narcotics, and relaxants is almost enough to neutralize the comparatively high cost of halothane, but this argument is only useful for soothing agitated hospital pharmacists. We believe that any anaesthetist who gives halothane a fair trial will become enthusiastic."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49, p. 31. Copyright by JOHN S. LUNDY.

A PRACTICAL CLINICAL RESEARCH SIGN OF GENERAL ANESTHESIA, by K. W. ERVIN and H. B. CRASILNECK: *Anesth. & Analg.* 37:229-230, 1958.

"In the course of an investigation of the influence of light, general anesthesia on posthypnotic suggestion, it became necessary to determine temporally the point at which the patient lost consciousness. The classic signs of Guedel for open drop ether are not applicable, and the signs generally used for anesthesia with Pentothal do not define this end-point sharply. . . .

"A group of 13 patients were hypnotized and posthypnotic suggestion given. On the day of operation, hypnosis was again produced and the posthypnotic suggestion reinforced. At the deepest level of the hypnotic trance, intravenous anesthesia with 2 per cent Pentothal was begun using small intermittent doses. The begin-

ning of actual unconsciousness was determined by repeating the verbal stimulus for the posthypnotic suggestion until the patient no longer made an attempt to respond. This was taken as a practical and reasonably critical determination of the loss of consciousness. . . .

"It was found that the simple act of touching the thumb with the tips of the first three fingers successively proved satisfactory as a posthypnotic suggestion in this study."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49, p. 67. Copyright by JOHN S. LUNDY.

FATAL INTRACARDIAC EMBOLIZATION FROM INDWELLING INTRAVENOUS POLYETHYLENE CATHETER, by W. B. AYERS: *Arch. Surg.* 75:259-262, 1957.

"Embolization by an indwelling intravenous polyethylene catheter used for prolonged parenteral infusion has been reported previously. . . . A 33-year-old white man . . . was admitted with a three-day history of abdominal pain, nausea, vomiting, and constipation. . . . The appendix was removed. . . . Ten days later, the patient was re-operated upon because of intermittent small-bowel mechanical obstruction. . . . On the sixth postoperative day, following the second operation, some stay sutures were removed from the second wound because of obvious wound infection. Two days later, a polyethylene catheter which had been placed in an antecubital vein in the right arm and through which the patient had been receiving parenteral fluids and antibiotic therapy, disappeared. . . . Repeated x-rays of the arm and chest were uninformative. . . . A second polyethylene catheter was placed in the opposite arm for parenteral infusions and antibiotic therapy. On the following day, thrombophlebitis necessitated removal of this catheter. . . .

"On the thirty-fifth hospital day, x-rays of his chest revealed spotty infiltration of the left lung. . . . On the following day, rectal examination revealed a pelvic mass. . . . The impression was that the lesions were metastatic pulmonary abscesses. In view of these findings and the septic course, it was thought that he most likely had a pelvic suppurative endophlebitis with septic embolization to the lungs. Consequently, extraperitoneal ligation of the inferior vena cava was done. . . . X-rays of the chest on the sixty-first day, eighteen days following the vena cava ligation, revealed a marked increase in extent of the consolidated areas formerly seen in the left lung, and it was also noted that the central lung field on the right was incompletely consolidated. . . . The following day, the patient appeared improved slightly. . . . The next day, his urinary output was low, and his lungs contained rhonchi and multiple moist rales bilaterally. The next morning he quietly died.

"At autopsy, the findings of multiple pulmonary abscesses were established. Lying in the right heart was the polyethylene catheter, with extensive acute bacterial endocarditis in and around it, the obvious source of the multiple pulmonary abscesses. . . .

"My colleagues and I now insist on the following routine precautions whenever an indwelling polyethylene catheter is to be used.

"1. A completely sterile technique is used (gowns, gloves, and mask). This will prevent in large part the phlebitis so commonly seen following this procedure, and thus allow the intravenous catheter to remain in place much longer.

"2. In addition to a suture tied around the catheter as it enters the skin, a single 'loop' knot, or 'half-hitch,' is taken in the catheter itself before attaching it to the needle and adapter leading to the infusion bottle. This thereupon knots itself into a large loop knot if pulled, and consequently prevents the catheter from being drawn into the vein. In addition to this, inasmuch as it is theoretically possible to have the above 'knot' untie itself, a drop of collodion is placed on the catheter as it enters the skin, thus adding an additional block to the catheter's being slipped up into the vein.

"3. The usual taping of the excess catheter to the skin is done but, as shown in the case presented here, is not to be relied on.

"4. Small amounts of a dilute solution of heparin to keep the catheter patent are likewise used routinely.

"In addition to the above routine now used on our service, we believe that if the catheter could be made radiopaque, an instant answer to the problem would be made available by x-ray."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49. Copyright by JOHN S. LUNDY.

POSTOPERATIVE PSYCHOSIS, by R. P. ATKINSON:
S. Clin. North America 37:835-844, 1957.

"There are many factors that can precipitate postoperative psychosis which include any situation, either physical or emotional, in which the individual has been subject to undue stress. . . . The formula of Selye applies to both the physical and psychical conditions in that the ability to adapt becomes ineffective, and the recuperative powers may be so weakened previously that the individual cannot recover. . . .

"Predisposing factors . . . (are) previous psychotic episodes; . . . previous history of alcoholism or drug addiction; . . . family history; . . . results of previous traumatic experience; . . . presence of undue anxiety or undue apathy; . . . bizarre behavior; . . . coincidence of the operative procedure with any recent emotional crisis . . . (and) the masked senile patient. . . .

"The busy surgeon does not have the time or the training to be able to anticipate all of the effects of the impact of the operating procedure upon the psyche of his patients. . . . The outstanding contribution that the surgeon can offer to the success of the procedure, aside from his surgical skill, is his ability to discuss the situation with the patient. . . .

"As Deutsch has pointed out, the fear of death is the chief psychological obstacle in the case of many patients. It may be welcomed or it may be dreaded. The anes-

thetist is the purveyor of the 'big sleep' or the narcosis that is tantamount to disappearance and remaining away. Also, in a sense, to the patient he is the second in command, and some patients consider him not only as the protector against pain and suffering but, in some instances, as a guardian against the punitive surgeon. The anesthetist can be of incalculable assistance in the preparation of the patient for the crisis he is to undergo. The anesthetist should have at least one visit with the patient prior to the operation. . . .

"Some of the newer drugs, namely, chlorpromazine, promazine and alpha-4 piperidyl benzhydrol hydrochloride, or Frenquel, have been used exclusively in the past two and a half years by the author for postoperative psychoses.

"In the treatment of the acute hyperkinetic, confused, agitated, delirious, and hallucinatory states, we favor the use of Frenquel for the following reasons: (1) absence of alterations in circulatory dynamics. No alterations have been recorded in blood pressure or pulse rate. We have encountered no instances of vasomotor collapse with this drug. (2) No other subjective or objective toxic reactions have been noted. (3) We have not observed the potentiating effects on other drugs, such as experienced with promazine or chlorpromazine. (4) Frenquel is apparently not an hypnotic or a depressant.

"In cases complicated by vomiting or nausea or both, either chlorpromazine or promazine is possibly of more value because of its antiemetic activity. . . .

"In spite of repeated warnings concerning the use of drugs of the hypnotic and opiate derivatives which further depress the circulation and oxygenation, and increase the symptoms, the following reactions may occur, especially in the older: onset of delirium, disorientation, agitation and panic, usually nocturnal, resulting in the phone call for more medication. This routine effectively compromises an already tenuous cerebral circulation with sometimes irreversible effects. In these cases, it is often good therapy to institute 6 to 7 per cent carbon dioxide inhalations in oxygen to stimulate cerebral circulation. Sometimes this alone will suffice. It is also necessary to eliminate the drugs of the aforementioned groups. In this instance, if one wishes to use chlorpromazine or promazine, it is wise to remember their potentiating effects and to delay their use until one is sure that the systemic effects of the previous, responsible drugs are eliminated. . . .

"In the frank depressive, there is often no chemical agent which is of value and in some of these cases, even in the postoperative period, electroshock therapy may be lifesaving. . . . The postoperative psychotic patient should be restrained in a humane way. He should have constant surveillance, preferably by professional nurses, and also preferably by nurses who are not irritated by irrational patients."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49. Copyright by JOHN S. LUNDY.



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BOOK REVIEWS

(Continued from page 326)

a textbook on gynecology of chapters on obstetric subjects of: abortion, ectopic pregnancy, and diseases of the trophoblast. It may be, however, that at the author's medical school these subjects are customarily presented in the gynecology teaching program. It would seem that a section on gynecologic urology should have been included. Whether or not uterine displacement is deserving of a separate chapter is a debatable point. It is gratifying to read the valuable sections on pediatric gynecology and preventive medicine and to find chapters on the pituitary and adrenal glands.

The material is presented in a readable direct manner. Emphasis is placed on the more commonly encountered gynecologic problems and major gynecologic pathology. Yet the infrequently occurring abnormalities and rare tumors, and so forth, have not been neglected. Clear explanations of pathologic conditions are given. Etiology, signs, symptoms, diagnosis, treatment, and prognosis follow in logical order. Of particular interest to the student and beginning practitioner are the author's recommendations of therapy. A dogmatic attitude is nevertheless avoided where diversity of opinion exists, as in treatment of early invasive squamous cell carcinoma of the cervix. It is unfortunate and rather surprising that there is virtually no mention of treatment of preinvasive squamous cell carcinoma of the cervix.

Many of the 343 illustrations are borrowed from other sources, yet they are all first rate, well selected, and properly credited. References have likewise been carefully selected and are sound and valuable. The index is accurate and satisfactory.

The book is seemingly well bound and is printed on a good grade of paper without a highly reflecting gloss. The print is clear and the type legible, but the printed lines are rather crowded, which detracts somewhat from the otherwise satisfactory make-up of the book.

WILLIAM B. STRONME, M.D.

•
The Hand—Its Anatomy and Diseases, by JOHN J. BYRNE, M.D., 1959. Springfield, Illinois: Charles C Thomas, 384 pages. \$10.50.

This book is an excellent and a concise survey of the whole field of hand disorders. The medical stu-

dent, the intern, and the resident in general or orthopedic surgery will all profit from this very readable book. In fact, there are many pearls in this book to be gleaned by even the most versatile hand surgeon.

This volume fills a need for the more casual participant in hand surgery who has not had the time to delve carefully into the larger volumes previously available on this rather difficult subject. The section on anatomy of the hand is particularly good both in text and drawings. There are two excellent chapters on infection outlining the bacteriologic factors and the surgical treatment. There are short chapters on general principles of the care of trauma, of tendon repair, of nerve injuries, and of fractures. There are further chapters on tumors of the hand, congenital disorders, vascular disorders, and a rather brief survey of reconstructive tendon surgery. The experienced hand surgeon may feel that some of the subjects are rather briefly covered.

The bibliography at the end of each chapter shows an excellent reference list of pertinent articles and texts. The author should be commended for a most excellent short text on a difficult subject.

JOHN H. MOE, M.D.

•
Epilepsy, by MANFRED SAKEL, M.D., 1958. New York: Philosophical Library, Inc., 204 pages. \$5.00.

This volume on epilepsy is the final work of one of the world's great psychiatrists. Dr. Sakel is perhaps best known for his revolutionary discovery of insulin shock treatment of mental illness. In the present volume, Dr. Sakel introduces his theory that epilepsy represents a chronic imbalance of the vegetative nervous system, the balance being restored by the mechanism of the convulsion itself. The thesis is presented that patients with convulsive disorders show a high degree of vago-tonus, which may gradually develop over long periods of time, and which, when sufficient in degree, becomes manifest by the characteristic irritability or prodromal symptoms of the epileptic. The convulsion itself represents an over-reaction of the sympathetic system in an effort to re-establish bodily homeostasis. On the basis of this theory, Dr. Sakel has developed an experimental therapy designed to produce a chronic increase in sympathetic tonus. This was presum-

ably achieved by implanting hyperactive thyroid tissue into the thyroid gland of seizure patients. While this novel approach to treatment has not been widely accepted by the majority of epileptologists, it represents an interesting contribution by a man whose creative thinking continued until his death.

The book as a whole, however, represents an account of a very personal and limited contact with the general epileptic population. It does not record any of the newer advances in the understanding of the pathophysiology of the epilepsies which has contributed so much to the development of new therapeutic techniques and to a more rational classification.

The book is recommended only as a monument in the history of medicine as the final contribution of a great doctor. It is not and does not pretend to be a complete review or an up-to-date text on this subject.

FRANK MORRELL, M.D.

○
Practical Blood Transfusion, edited by J. D. JAMES, M.D., 1958. Springfield, Illinois: Charles C Thomas. \$4.50.

This book concerns the practical aspects of blood transfusion, and its author, Dr. J. D. James, draws on a great wealth of experience as director of the North London Blood Transfusion Service. The British organizational methods as described are of interest, though not essential for obtaining benefit from the book.

Clinical and laboratory aspects are both emphasized. The donors are used only twice a year as a rule and are not accepted over 65 years of age. Special precautions are taken to protect the recipient from the transmission of diseases, such as infectious hepatitis. The laboratory aspects of the blood transfusions are carefully considered and fill a major portion of the book.

The chapter on treatment by blood transfusions emphasizes the common indications, such as replacement of acute blood loss, as well as the anemic states and the severe blood dyscrasias.

Adequate references are included. This volume is a worthwhile collection of information regarding the why and how of blood transfusions for all interested physicians, laboratory staff members, and technicians.

C. A. MCKINLAY, M.D.

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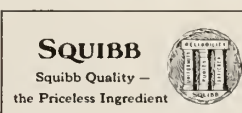
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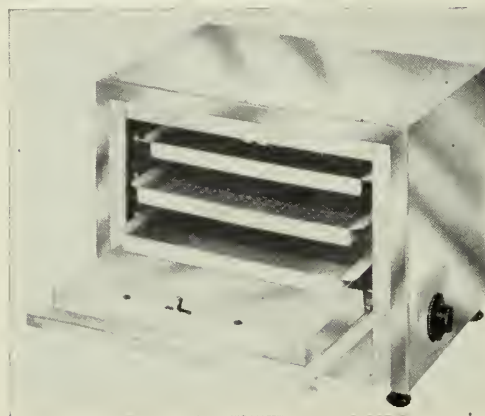
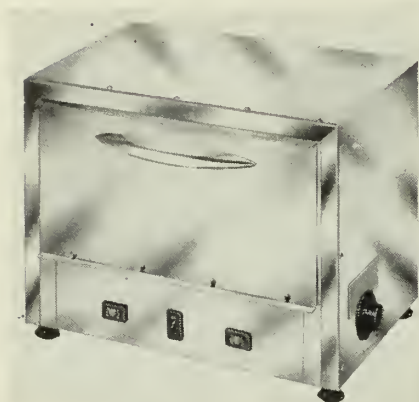
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News Briefs . . .

North Dakota

DR. JOHN C. FAWCETT, of Devils Lake, took office as president of the North Dakota State Medical Association at the organization's seventy-second annual meeting in Bismarck. Other officers are: Dr. C. M. Lund, Williston, president-elect; Dr. E. H. Boerth, Bismarck, first vice president; Dr. E. J. Larson, Jamestown, second vice president; Dr. Frank Naegeli, Minot, secretary; Dr. R. D. Nierling, Jamestown, treasurer; and Dr. G. A. Dodds, Fargo, speaker of the house.

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DR. F. D. PETERKIN, of Langdon, has been appointed Cavalier County health officer. He replaces Dr. Paul V. Adams who has begun a four-year postgraduate course in Winnipeg. Dr. Peterkin is also replacing Dr. Adams as Langdon city health officer. Dr. Peterkin has practiced in Langdon since June 1952.

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DR. JAMES F. HOUGHTON, a member of the Department of Internal Medicine at the Dakota Clinic, Fargo, has been elected to the American College of Cardiology. Formal presentation took place at the annual meeting of the College in Philadelphia late in May.

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DR. ROBERT C. GAEBE, who entered private practice in Casselton four years ago, has joined the staff of the Valley City Clinic. He will be associated with Drs. G. Christianson, J. W. Goven, C. J. Klein, and J. P. Merrett. Dr. Gaebe interned at Deaconess Hospital, Grand Forks, and served as a resident in internal medicine at the Quain and Ramstad Clinic, Bismarck.

• • • • •

DR. WALTER SKWAROK, who recently completed postgraduate work in surgery at Deer Lodge Hospital, Winnipeg, has taken over the practice of Dr. Julian Tosky in Hebron. Dr. Tosky is now engaged in postgraduate work in psychiatry at the Menninger Foundation, Topeka, Kansas. Dr. Skwarok served with the Canadian forces in northwestern Europe in World War II from 1942 to 1946. He received his medical degree from the University of Manitoba in 1954 and served with NATO forces in Europe from 1955 to 1957.

Minnesota

DR. ALEXANDER ALBERT, head of the endocrinology laboratory at the Mayo Clinic and professor of physiology in the Mayo Foundation, was elected president-elect of the American Goiter Association at the group's annual meeting in Chicago. In 1956, the association presented him with its award of merit. Currently, Dr. Albert is editor-in-chief of *The Journal of Clinical Endocrinology and Metabolism* and consulting editor of the *American Journal of Physiology*.

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DR. DAVID T. CARR, a consultant in medicine at the Mayo Clinic and assistant professor of medicine in the Mayo Foundation, was elected a director-at-large of the

(Continued on page 23A)

NEWS BRIEFS

(Continued from page 20A)

National Tuberculosis Association at its annual meeting in Chicago. A specialist in internal medicine, Dr. Carr has a special interest in diseases of the chest.

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DR. CLARENCE JACOBSON, of Chisholm, was named president-elect of the Minnesota State Medical Association at the group's annual convention held recently in Duluth. A well-known Iron Range surgeon and general practitioner, Dr. Jacobson will assume office January 1 and will succeed Dr. B. B. Souster, of St. Paul. Currently president of the Adams Clinic Association, Hibbing, Dr. Jacobson maintains offices in both Chisholm and Hibbing.

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DR. JOHN A. CALLAHAN, consultant in medicine at the Mayo Clinic and instructor in medicine in the Mayo Foundation, has been appointed a member of the Minnesota State Board of Examiners in the Basic Sciences by Governor Orville L. Freeman. Dr. Callahan will serve for a six-year term expiring in 1965.

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THE MINNESOTA CHAPTER of the Arthritis and Rheumatism Foundation has awarded 6 research grants totaling \$16,000 to 7 Minnesota physicians. Grants were made to Dr. John M. Wolfe, Duluth, \$500; Dr. Robert A. Good and Dr. Robert A. Bridges, University of Minnesota Hospitals, \$6,500; Dr. Richard W. Von Korff, University of Minnesota Hospitals, \$2,000; Dr. Paul Bilka, Minneapolis, \$1,000; Dr. James C. Melby, University of

Minnesota Hospitals, \$5,000; and Dr. Charles H. Slocomb, Mayo Clinic, \$1,000.

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DR. JOHN F. BRIGGS, St. Paul internist and professional education chairman for the Minnesota Heart Association, gave the Louis Mark Lecture before the American College of Chest Physicians in Atlantic City. Dr. Briggs spoke on "Optimism in Heart Disease." The Louis Mark Lecture is in memory of the late internationally known chest physician who was a native of Minnesota.

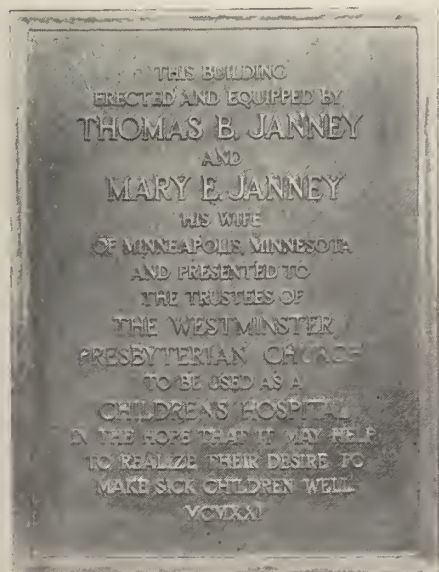
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DR. L. W. CLARK, of Spring Valley, was honored recently at an open house given in recognition of his fiftieth year as a physician. Person after person lauded Dr. Clark and his family for their contributions to the community. Among the many friends who came to pay tribute to Dr. Clark were out of town guests from Minneapolis, St. Paul, Winona, LeRoy, Austin, Preston, West Concord, Dexter, Canton, Rochester, Caledonia, Waterloo, Cresco, Lime Springs, and Chester.

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DR. J. FELIX TRAXLER was guest of honor at a banquet given recently in appreciation of his forty-three years of service to the community of Henderson. The more than 260 persons who attended the dinner bore testimony of the high esteem the physician is held by all who know him. A plaque presented to Dr. Traxler read: "Dr. J. F. Traxler, presented by the community of Henderson in recognition of forty-three years of faithful service, 1916-1959."

(Continued on page 24A)



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Children Well"*

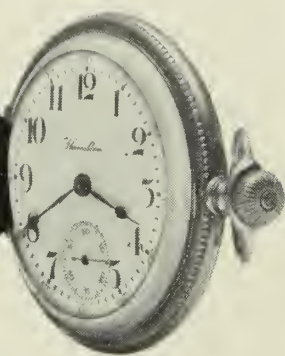
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NEWS BRIEFS

(Continued from page 23A)

South Dakota

DR. ROBERT DELANEY left Mitchell in May for a three-month tour through Africa as a medical missionary. During a hunting safari in Africa in 1955, Dr. Delaney became interested in the medical problems of that country. Since then, he has had a desire to return and offer medical assistance to the people of Africa who, he says, live in a "cesspool of disease."

• • • •

DR. EDWIN W. GERRISH joined the Lowe Clinic in Moberg in June. He had been affiliated with the Klefstad Clinic in Greenbush, Minnesota, since September 1958. Prior to that time, Dr. Gerrish had been an assistant professor of surgery at Western Reserve School of Medicine, Cleveland. He is a fellow of the American College of Surgeons and a diplomate of the American Board of Surgery. An author of several scientific papers, Dr. Gerrish helped Dr. Benjamin Spock write the surgical portions of his latest book, "Baby and Child Care."

Deaths . . .

DR. GORDON M. ERSKINE, 59, a physician in Grand Rapids, Minnesota, for more than twenty years, died May 26 in Tucson, Arizona. He had retired in 1957 because of ill health. Before embarking on his medical career, Dr. Erskine was a newspaper man.

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DR. EUGENE FLYNN, 54, who had practiced in Pierre, South Dakota, since 1956, died May 2 after a cerebral hemorrhage. A graduate of the University of Arkansas School of Medicine, Dr. Flynn furthered his education at the University of Vienna and the Rotunda Hospital, Dublin, Ireland. Before establishing practice in Pierre, he had practiced in San Antonio, Texas, and Pickstown, South Dakota.

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DR. RALPH K. GHORMLEY, 66, former head of the Section of Orthopedic Surgery at the Mayo Clinic, died June 6 in Carmel, California, after a heart attack. He had retired from the clinic in 1958. An internationally recognized authority on orthopedic surgery, Dr. Ghormley was honored in 1957 by former fellows in orthopedic surgery of the Mayo Foundation and colleagues at the Mayo Clinic by the establishment of the Ralph K. Ghormley Traveling Scholarship, which is designed to enable recipients to visit leading centers in orthopedic surgery in this country and abroad. Among the many medical groups of which he was a member are the American Surgical Association, the Clinical Society of Orthopaedic Surgery, the American Academy of Orthopaedic Surgeons, the American Association for the Surgery of Trauma, and the International Society of Orthopaedic Surgery and Traumatology.

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DR. ROY E. JERNSTROM, 62, well-known physician and surgeon in Rapid City, South Dakota, died May 10 after a short illness. Dr. Jernstrom was a member of numerous medical organizations, a fellow of the American College of Surgeons, a diplomate of the International College of Surgeons, and past president of the Rapid City and Black Hills medical societies.

COMING in *September* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings.*

- John F. Briggs, M.D., of St. Paul, is the guest editor of a new series of articles on Cardiovascular Diseases that will be published each month. The series, which begins in September, has been developed to stress the practical application of many of the recent advances in the diagnosis and treatment of Cardiovascular Diseases.

- The first article in the new series is by William F. Massitello, M.D., of St. Paul, entitled "Office Diagnosis of Congenital Heart Disease." Pertinent features of the principal types of congenital heart disease that may be encountered in office practice are pointed out. An outline describing and classifying common cardiac conditions is presented, which should prove helpful to the general practitioner in recognizing and delineating the more common congenital lesions.

- "Some Aspects of Surgery of Congenital Heart Disease" by Lloyd D. MacLean, M.D., of St. Paul, is also scheduled to appear in September in the new series on Cardiovascular Diseases. The unique characteristics of the most common types of congenital cardiac defects are described, and the circumstances under which their surgical correction is indicated are discussed.

- In the series on Fractures, Roland F. Neumann, M.D., of Minneapolis, writes on "Femoral Shaft Fractures." A comprehensive review of the emergency management and treatment of these fractures in adults is presented. Measures designed to combat possible complications that may develop after such fractures are described.

- The Transactions of the North Dakota State Medical Association will again be published in two issues—September and October. Officers and members of the various committees will be listed in September. Among the many reports that will appear will be those of the president, secretary, executive secretary, chairman of the council, president of the Woman's Auxiliary, representative to the Medical Center Advisory Council, and delegate to the American Medical Association. District reports and committee reports will also be included.

Meetings and Announcements

UNIVERSITY OF MINNESOTA

MEDICAL CONTINUATION COURSES

September 22-24—Pediatrics for Pediatricians

October 5-7—Obstetrics for General Physicians

October 22-24—Dermatology for General Physicians

November 2-6—Gastrointestinal Radiography for Radiologists

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

UNIVERSITY OF NEBRASKA

POSTGRADUATE COURSE

A 10-course series of postgraduate programs in Advanced Electrocardiology will be offered September 28 through 30 by the University of Nebraska College of Medicine. Dr. Enrique Cabrera, of the Institute of Cardiology in Mexico City, and Dr. Eugene Lepeschkin, of the University of Vermont, will present the course. The fee will be \$50. Send applications to Office of Medical Extension, University of Nebraska College of Medicine, 42nd and Dewey, Omaha 5.

ULTRASONICS IN MEDICINE MEETING

The America Institute of Ultrasonics in Medicine will hold its annual meeting September 2 at the Leamington Hotel, Minneapolis. Guest speaker at the luncheon meeting will be Russell Meyers, M.D., professor of surgery and chairman, Division of Neurosurgery, State University of Iowa Hospitals and College of Medicine. For further information, contact John H. Aldes, M.D., secretary, 4833 Fountain Ave., Los Angeles 29.

KENNY FOUNDATION SCHOLARSHIPS

Sister Elizabeth Kenny Foundation again this year will offer postdoctoral research scholarships in the field of neuromuscular diseases. Scholars will be appointed annually. Each grant will provide a stipend for five years at the rate of \$5,000 to \$7,000 per year, depending upon the scholar's qualifications. Address inquiries to Dr. E. J. Huenekens, Medical Director, Sister Elizabeth Kenny Foundation, Inc., 2400 Foshay Tower, Minneapolis 2.

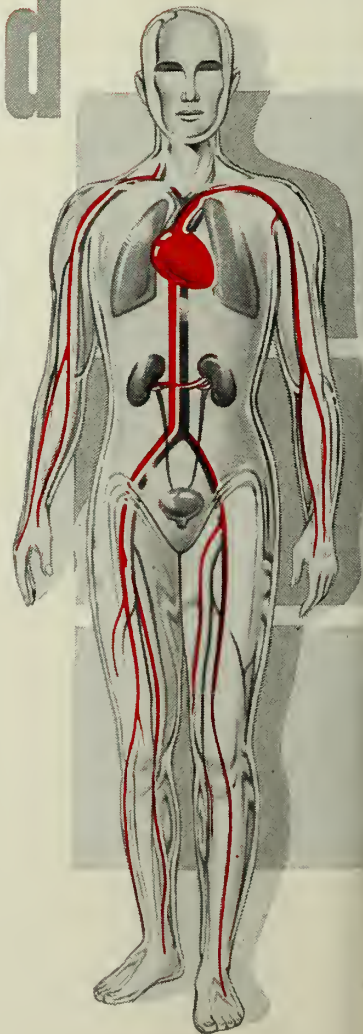
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Practical Aspects of the Management of Urinary-Tract Infections

EDWARD N. COOK, M.D.

Rochester, Minnesota

WITH OUR IMPROVED MEANS of diagnosis and treatment of infections of the urinary tract, we should be able to have a most reassuring attitude in regard to the outcome in almost any case. However, because of the careless and, at times, needless therapy that is suggested, many patients with such conditions are cared for in a very poor fashion. The reason for this is difficult to explain when it is realized that the application of plain common sense will lead to proper evaluation of the existing situation and, consequently, to proper therapy.

Knowledge of certain fundamental concepts of diagnosis and treatment is necessary if we are to view this interesting problem properly. We must know whether an infection is present and whether it exists alone or as part of a coexisting pathologic entity. We must try to find out the probable site of the infection and, if possible, the type of infection present. Careful analysis of the history in an individual case is worthwhile. Actually, the history elicited from the patient and the results of examination of a properly collected specimen of urine proves most valuable in the majority of instances. After completing these phases of the problem at hand, we are ready to decide what treatment is proper. To

decide proper treatment, we should be familiar with a number of the available therapeutic agents. With an evaluation of a carefully taken history, the knowledge obtained from accurate examination of a carefully obtained specimen of urine, and an appreciation of the most effective forms of therapy, we will then be ready to prescribe the proper treatment.

DIAGNOSIS

History. On previous occasions, I have called attention to a very important diagnostic triad. The first part of the triad, the history, frequently provides valuable information about the site of existing infection and about the duration of the complaint and its severity and often leads us to suspect the presence of a coexisting lesion. If burning on urination is the presenting symptom, it is useful to know whether the burning occurs before voiding, during voiding, or mainly at the conclusion of the act. In urethritis per se, it is present during the act. When it accompanies trigonitis, it usually occurs before and after urination and may be associated with urgency and a cramping sensation that develops after voiding.

In the conditions just mentioned, the urine is usually clear and microscopic examination does not reveal any pus cells or organisms, but, if pyuria and bacteriuria are present, we no doubt are dealing with cystitis or pyelonephritis. Frequent urination accompanies burning urination much of the time. When frequency occurs alone, reaches a marked degree, and is often accompanied by pain referred to the bladder, perineum,

EDWARD N. COOK is with the Section of Urology at the Mayo Clinic and is professor of urology in the Mayo Foundation.

Paper presented at the Clinical Session of the American Medical Association, Minneapolis, December 2 to 5, 1958.

urethra, or buttocks, the presence of a particular lesion should be immediately suspected, namely, interstitial cystitis, which occurs primarily in women. The urinary findings are negative, and the patient's distress is relieved by urination. Briefly, the aforementioned facts should serve as reminders of the need and value of a well-taken history.

Physical findings. The second part of the diagnostic triad is the physical examination. The genitalia should be carefully surveyed in both men and women patients. The urinary meatus should be examined for evidence of stenosis or inflammation. In the woman, a vaginal examination should be done, including a careful inspection of the cervix. Any masses should be checked by palpation and transillumination. The abdomen and loin should be carefully palpated and any tenderness or masses noted. The lower part of the abdomen should be examined for evidence of an overdistended bladder, and, finally, a rectal examination should be made.

Urinary sediment. Microscopic examination of the urinary sediment is the third part of the diagnostic triad. A clean specimen must be obtained. This is done in the male by collecting a second-glass specimen after proper cleansing of the glans penis and meatus and in the female by catheterization after cleansing the vulva and the meatus. Such specimens are then centrifuged, and the sediment is first examined in the wet smear for cellular elements, spermatozoa, crystals, and epithelial debris. The smear is then dried and stained by Gram's method to determine whether or not organisms are present. This simple staining method is of the greatest value as a routine procedure and, in most instances, will provide all the information necessary for the satisfactory treatment of urinary tract infections.

To identify existing organisms, cultures of the urine are, of course, needed. I emphasize at this point, however, that no attempt should be made to make a diagnosis or plan any therapy on the strength of the information obtained from the culture alone. It must be remembered that in any cultural work in bacteriology, the problem of contamination of specimens is always present even when the greatest care is exercised to keep everything sterile. Consequently, I always insist that every culture of the urine be checked by a Gram stain of the urinary sediment at the time the culture is sent to the laboratory. This is particularly important if the culture should be reported positive for *Proteus*, *Pseudomonas*, or *Streptococcus faecalis*. These organisms often contaminate specimens even when the best possible technic is used.

At this point, I should like to mention bacterial sensitivity studies. These are not indicated routinely but should always be made if the most commonly used medications have not been successful in eradicating the infection or in desperately ill patients to whom the more toxic antibiotics may have to be given as a lifesaving measure.

QUESTION OF COMPLETE UROLOGIC INVESTIGATION

From the data provided by the diagnostic triad, an obvious question that frequently arises can usually be answered: When should we insist on a complete urologic investigation for the patient who presents symptoms referable to the urinary tract? If the history or physical findings suggest a renal lesion or a more complicated lesion in the lower part of the urinary tract, such as a stone or obstruction, then a more extensive urologic study should be done at the start. Still another basis for determining whether a complete study is indicated is the response to therapy. If the infection has not been eradicated by two or three courses of medication, further search must be made for contributing causes. This is necessary because of the discrepancy between the results obtained in simple uncomplicated infection of the urinary tract and those obtained in infection secondary to stone, tumor, or obstruction. A coexisting pathologic condition precludes a satisfactory end result from any kind of medication unless that condition is eradicated.

DRUG THERAPY

Sulfouamides. Management of the usual bacterial infections of the urinary tract will now be considered. Infections with gram-negative bacilli are common, and such bacilli are sensitive to most present day antiseptics. The sulfenamides are still the most nearly universally used antibacterial agents for infections of the urinary tract. They can be given in small doses with few, if any, toxic reactions. Then, too, they are inexpensive. The usual dosage, 2.0 gm. daily for one week, is effective against all the commonly encountered bacilli except *Pseudomonas*. These drugs are very useful against streptococci with the exception of *Str. faecalis*. In some instances, they may destroy staphylococci. When they are used, the patient should be advised to repeat the course of therapy the first week of each month for a few months even though there has been no subjective evidence of return of the primary trouble. I believe that recurrences may be prevented in this way.

Other drugs. When the sulfonamides have not

proved effective or the patient cannot tolerate them, which is not the rule, two other broad-spectrum medications are of value. The first is nitrofurantoin (Furadantin), which is given in doses of 50 to 100 mg. four times a day. Many patients complain of nausea following ingestion of this drug, but the nausea may be reduced to a minimum by giving the drug in the middle of the meal and by giving the bedtime dose with food. A most useful antibiotic has been tetracycline (Achromycin). It is fairly well tolerated by most patients in a dosage of 250 mg. given four times a day for five to seven days. If one or another of these drugs does not eradicate an existing infection, sensitivity studies should be made to determine whether or not one of the other antibiotics may be indicated. Also, let me mention again the importance of excluding at this point the presence of an associated lesion that must be cared for before any chemotherapeutic or antibiotic agent can be effective.

Many other antibacterial agents, such as penicillin, streptomycin, Erythromycin, Cyclamycin, chloramphenicol, neomycin, and polymycin, at times hold a definite place in our therapeutic resources. However, the last three may cause rather serious toxic reactions and therefore should not be used unless they are definitely indicated as determined by sensitivity tests and are necessary as a lifesaving measure. Experience with penicillin illustrates why we should never become dogmatic about the value of any of these drugs. A few years ago, penicillin was most valuable in destroying organisms of the genus *Staphylococcus*, but today it often is of little value when given alone in staphylococcal infections. However, when given in conjunction with streptomycin or one of the sulfonamides, it may be of considerable value. This synergistic relationship should be appreciated, as it is frequently of value in the management of infections of the urinary tract. Because of the presence of many resistant strains of staphylococci at the present time, I would like to mention certain specific drugs. Penicillin and streptomycin in combination may be of value, and Erythromycin is useful at times. When these drugs fail, Cyclamycin may prove efficacious. Recent reports tend to show that the latter drug has eradicated more than two-thirds of Erythromycin-resistant staphylococci.

LOCAL TREATMENT

Now I should like to say a few words concerning the value of properly administered local treatment. Lavage of the bladder with potassium permanganate, boric acid, or acetic acid

followed by the instillation of $\frac{1}{2}$ oz. (15 cc.) of 5 per cent solution of mild silver protein (Argyrol) may give quick relief from acute symptoms. When incrustated cystitis is present, continuous lavage with solutions of silver nitrate of increasing strength are most helpful. Also, removal of the incrustations with the patient under anesthesia hastens recovery.

Let us now consider a few of the more common inflammatory diseases of the urinary tract that are mismanaged much of the time.

URETHRITIS IN THE FEMALE

Symptoms and treatment. Urethritis is no doubt the most common urologic lesion to which the female falls heir, and it is rarely helped by any of the so-called wonder drugs. It consists primarily of a mild inflammatory reaction in the mucosa with granular change, and it may be associated with inflammatory tags at the vesical neck or with cicatricial changes that produce narrowing of the channel. The usual symptoms are frequent urination with burning and, at times, dysuria. When there is an associated urgency or grabbing sensation at the base of the bladder after urination, trigonitis is present as well.

For the urethritis, strong silver protein (Protargin) or nitrofurazone (Furacin) urethral suppositories instilled once daily for five or six days is helpful. On occasion, small tampons containing 5 per cent mild silver protein instead of suppositories can be placed in the urethra. When there is an associated trigonitis, the urethral treatment may be supplemented by instilling $\frac{1}{2}$ oz. of 5 per cent mild silver protein directly into the bladder and instructing the patient to retain it as long as possible. When the urethra is definitely narrowed because of cicatricial change, it should be dilated adequately and the previously mentioned therapy administered. Dilation to the size of a 32 or 34 F. catheter is most helpful and can be done with minimal discomfort to the patient if straight sounds are used carefully. If the patient still complains of difficult urination after adequate dilation, a careful check should be made for residual urine, which, if present repeatedly, may indicate a need for transurethral resection of the vesical neck.

Urethral diverticulum. Patients with this lesion usually complain of symptoms that are more severe than those seen in simple urethritis but that are of the same type. In addition, there may be a sense of pressure low in the pelvis with the feeling of wanting to pass something by the vagina. Sometimes a mass can be felt in the anterior margin of the introitus of the vagina.

Many of these patients say that a few minutes after voiding they pass a few cubic centimeters of urine which soils their clothing. Dysuria is common. Such a history suggests the need for endoscopic examination of the urethra. The orifice of the diverticulum is usually on the floor of the proximal half of the urethra, but it has been found on the lateral walls and even anteriorly. Vaginal palpation of the urethra at the time of endoscopy helps demonstrate the diverticulum and may produce a rather thick purulent discharge from the opening. Urethral diverticula should be removed surgically as they are seldom benefited by local therapy.

Other factors. As I stated previously, urethritis is common in women. Because it is usually chronic, it causes much apprehension in the minds of the women who have this condition. It may precipitate a neurosis because of the fear of cancer. Reassuring the patient is equally as important as local therapy, as most patients can learn to live with urethritis when it is minimal if they appreciate that it is not a serious disease. I should like here to urge that the physician guard against overtreatment. The urethra is highly sensitive, and this sensitivity may be increased by treatment that is too enthusiastic and too prolonged. In general, fulguration of the urethra is rarely if ever indicated. Our experience at the Mayo Clinic leads us to believe that most patients with urethritis are made worse by such therapy.

Disturbances of the external urethral meatus in the female may be troublesome. Stenosis should be handled by dilation. At times, prolapse of the urethral mucosa is a part of urethritis. If the rosette of mucosa that appears at the external meatus is granular and inflamed, the ordinary urethral treatment is given and the presenting mucosa is lightly cauterized with a silver nitrate stick. If perimeatitis is an associated condition, a bland ointment placed on a small wisp of cotton and applied directly against the inflamed area at bedtime may be helpful.

Another lesion of the external urethral meatus in the female is the urethral caruncle. It presents a rather typical appearance and is at times extremely irritating to the patient. It is a small bulblike projection that is beefy red in appearance, painful to the touch, and bleeds easily. This condition is best handled by excision with the clamp and scissors and the application of a cauterizing solution, such as mercuric nitrate, to the base of the lesion. It is rarely malignant but tends to recur. The excised specimen should always be examined by the pathologist for any evidence of malignant disease.

It is open to question whether or not chronic urethritis in the male, exclusive of gonorrheal urethritis, actually exists. At most, it is relatively rare, and, when present, it usually causes more apprehension and concern than its clinical significance warrants. A study of any discharge is, of course, important. If pus cells predominate, instillations of 5 per cent mild silver protein in the anterior urethra may be of benefit; an associated stricture should also be excluded. Usually, however, the discharge is watery, contains cellular debris and epithelium, and is almost devoid of pus cells. Such a discharge is, I believe, little more than a result of milking the urethra after a long interval between voidings or after sexual stimulation and should be considered normal. The cells of the nasal passage have a normal secretion, and the cells of the urethral passage also are entitled to a normal secretion. Overenthusiastic treatment of this condition often aggravates the situation. Unless the discharge consists of pus cells, I question its clinical significance.

CHRONIC PROSTATITIS

Previously I summed up our attitude at the Mayo Clinic concerning chronic prostatitis as follows:

"This condition has certainly been mistreated, overtreated, and undertreated. At the Mayo Clinic, management of chronic prostatitis is based on a few simple facts and may be open to argument. However, the plan used has been quite successful in our hands. For patients less than 40 years of age, we usually advise treatment, and it is in this group that prostatitis may be associated with another focus of infection, such as may occur in the teeth or tonsils. I would not imply that all prostatic infection is so related, but I do feel that in the younger group of patients such a possibility should be kept in mind. In persons more than 40 years of age, chronic prostatitis is a relatively common finding and unless it is causing local symptoms it is better left alone. If treatment of prostatitis is indicated, the following plan is carried out: Actually, massage of the prostate acts only as a mechanical aid to drainage of the infected gland. We feel that it should be carried out regularly three times weekly for two weeks and then two times weekly for an additional eight to ten weeks. Thereafter, treatment is stopped regardless of findings. Re-examination is suggested in three months. Usually, the prostatic secretion at this time is normal or reveals only minimal residual infection. If a considerable degree of prostatitis persists, further massage two times

weekly for four to six weeks may be advisable. It is well to check for prostatic calculi before prostatic massage is instituted because such treatment is usually contraindicated when calculi are present. Calculi are usually asymptomatic, but at times they may be associated with chronic abscesses in the ducts of the prostate which are responsible for recurrent attacks of trouble. These may be readily suspected at cystoscopy, and incision and drainage of these regions and transurethral evacuation of the calculi may be indicated."¹

This group of conditions, namely, chronic urethritis and its modifications in the female and chronic urethritis and prostatitis in the male, is seldom helped by chemotherapy or antibiotic therapy. Too frequently patients have been given these expensive drugs for a considerable time with little or no relief of their complaints. Unless these conditions have an associated bacteriuria and pyuria, as evidenced in a properly obtained specimen, these drugs do not need to

be given orally, since the urine usually is sterile and local therapy will be necessary to bring about the proper relief of symptoms.

CONCLUSION

I should like to urge that the urinary complaint of each patient be carefully evaluated. If the history and the results of physical examination and urinalysis are studied carefully, the application of common sense will lead to proper management in each case. There is no place for dogma in regard to any particular form of therapy or the use of any particular drug. I have suggested certain medicines because they have proved effective and are unlikely to cause more than minimal toxic reactions. Any set program will, of course, have to be modified from time to time, but by knowing and appreciating the basic facts we can give our patients the best care.

REFERENCE

1. COOK, E. N.: Office problems in urology. *Rocky Mountain M. J.* 55:41, 1958.

ABDOMINOPERINEAL RESECTION for advanced ulcerative colitis will not alter sexual function of men and women in the sexually active years provided the surgeon avoids damaging the pelvic autonomic nerves. Stress of the operation often diminishes sexual interest and abilities for variable periods and should not be interpreted as nervous tissue destruction until sufficient time has elapsed. Conception, pregnancy, and delivery are not adversely affected.

Abdominoperineal resection for ulcerative colitis should be more limited than that for cancer. Incisions should be made in the peritoneum of the sigmoid mesentery close to the bowel and about the rectouterine or rectovesical pouches close to the rectum. The superior hemorrhoidal vessels are ligated close to the bowel so that the layer of fatty tissue overlying the sacral promontory and hollow of the sacrum is not disturbed. Lateral dissection in the area of the middle hemorrhoidal vessels should adhere to the rectal wall. For the perineal stage of operation, only the diseased rectum and anus are excised and dissection is not carried onto the levator ani muscles.

LEROY H. STAHLGREN, M.D., and L. KRAEER FERGUSON, M.D., University and Woman's Medical College of Pennsylvania, Philadelphia, and Philadelphia General Hospital. *Arch Surg.* 78:604, 1959.

Tumor Immunity and Tissue Transplantation

HERBERT M. HIRSCH, Ph.D.

Minneapolis, Minnesota

OF THE FOUR MAIN APPROACHES to tumor therapy—chemotherapy, immunotherapy, surgery, and radiation—that of immunology has always held a great fascination for researchers in the cancer field. The reason for this is obvious: it depends on the postulate that tumor tissue is characterized by specific antigenic components *not* present in normal tissue and that specific immune reactions could be developed which would utilize this antigenic difference.

The field of tumor immunity has had a varied history and, in common with other concepts in the field of cancer, has been characterized by periods of elation and depression. Perhaps in no other field of science do certain concepts become fashionable quite so periodically, only to be discarded again after a number of years. To give an example, the virus theory explaining the origin of cancer has been held before, was discarded, and is again coming to the forefront. It is the same with the immunologic approach to cancer. Great hopes have been held for the field several times during the last sixty to seventy years, only to subside again and the field to fall into disrepute. There are those, usually not well informed, who think the field of tumor immunity is sterile and useless. This opinion is false because, even though immunotherapy of cancer has on the whole been a disappointment so far, fundamental information has come out of the work on tumor immunity as a by-product. These advances have had implications for the whole field of biology; for example, through it, the first approach to the problem of mammalian cell genetics or somatic genetics has been made. Moreover, knowledge of the genetics of tissue transplantation is based to a large extent on studies with tumor transplantation. And although immunotherapy of cancer itself has been a source of disappointment, work in the field continues

unabated. Why? Perhaps because hope springs eternal in the human breast. On the other hand, two factors which recently have come into prominence lend hope to renewed useful work in the field. One is the demonstration in an increasing number of cases of virus-like particles being implicated in tumor formation. It is only sound to try to cure or prevent tumors in cases in which virus-like particles have been shown to be involved by the immunologic means which have proved of such great value in the fight against other virus-induced diseases. A second factor is the recent demonstration of possible antigenic differences between tumor and host. This aspect will be dealt with in greater detail later on.

The immunologic approach to cancer can be broken down into two main avenues—those of passive and active immunization. The passive approach¹ entails making the antibodies to be used in a foreign species, usually the rabbit, guinea pig, or horse, by injecting tumor material into them and using the resulting antibodies in tumor therapy. The antibodies are called cytotoxic sera, and, although active antibody against tumor cells can easily be demonstrated by the methods of combining tumor cells and antibody before injecting or by adding the cytotoxic antibodies to tissue culture and observing its cytotoxic effect, this approach has yielded disappointing results *in vivo*, probably mainly because of the presence of cellular barriers and failure to achieve sufficiently high antibody levels in the tumorous animals. Recently, attempts have been made to cross the cellular barrier by digesting the antibodies with trypsin to obtain a smaller but still active molecule. That the field is still not a “dead horse” is attested to by recent claims² of a discovery of sera useful for palliative therapy in cancer. This remains to be confirmed. At any rate, the aspects pertaining to active immunity will be primarily dealt with here, as they are more interesting from a genetic and immunologic standpoint.

The road in the early work on active tumor immunity was beset by many difficulties. The early workers in the field, by necessity, had to utilize genetically heterogenous animals. Tumor formation in such animals is erratic, and, when attempts were made to transplant these tumors,

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very confusing results were obtained. It was found that tumors from one animal first grew in another animal of the same species and then regressed. An animal in which a tumor had grown and regressed no longer even supported the temporary growth of that tumor when it was transplanted for a second time. When a transplanted tumor grew and then regressed, it was taken as an instance of a cure. Yet, confusingly, in other instances, a transplanted tumor would take and kill the host. Evidence that immunity to transplanted tumors was of the same kind as that provoked against various microorganisms was sought but without success.

It was, ironically, at this point—when a spontaneous tumor was first transplanted to other animals of the same species and found sometimes to take and more frequently to be rejected—that the goal of tumor immunity inadvertently was lost sight of and the field of transplantation immunity started. For it should not be forgotten that the study of tumor immunity really deals with the question, How can one immunize against *spontaneous* tumors? The early workers did not realize that the rejection of the tumors was due simply to the genetic gap between donor and recipient host. They thought they were using transplantation to study tumor immunity, while actually they were using tumors to study transplantation phenomena.³ The fundamental error of confusing immunity against transplanted tumors with immunity against spontaneous tumors has plagued the field of tumor immunity ever since.

Furthermore, there was the necessity in early work to use, usually, long-transplanted tumors for experimental purposes. Such long-transplanted tumors are biologically different from spontaneous tumors. Use of poorly chosen biologic test material, even after the advent of inbred animals, was another difficulty. We shall come back to these points later on.

The epitomy of early failures was expressed in Haaland's dictum,⁴ which stated that "the animal cannot be immunized against its own neoplastic cells" and which summarized the disappointing findings that it was often possible to immunize one animal against the tumor from another but seemingly impossible to immunize a given animal against its own tumor cells.

A new chapter in tumor immunity was opened about thirty-five years ago by the advent of inbred animals. It put the entire picture of tumor transplantation on genetically sound lines. This advance was due to the work of Little, Snell, Bittner, and others (for review see⁵⁻⁸). What was done, of course, was to make brother-sister

matings until an inbred line was obtained; members of such lines resemble each other closely. Twenty such matings are necessary to obtain a genetically reasonably homogeneous population; after 20 generations, 98 per cent homozygosity is obtained, which means these lines are also isogenic at 98 per cent of the genetic loci. Such inbred lines were genetically homogeneous enough to allow tumor transplantations between members of the same inbred line and have the tumors take in all instances. Moreover, by selective breeding, high cancer and low cancer strains could be obtained.

It was through the use of such inbred lines that it was finally realized that the confusing results with tumor transplantation by the early workers were due simply to genetic variability in the stocks that they used.

Yet, along the way as tumor immunity was studied through tumor transplantation, important advances were made. The work that was done provided the main basis for the beginnings we have today of what can be called a tissue genetics and for tissue transplantation in general.

- The advances that were made include:
1. Knowledge of histocompatibility loci, that is, an understanding of what the genetic basis is that underlies graft take or graft failure.
 2. Data concerning the ploidy of tumor and other factors which govern relations between graft and host and data of great value for tissue transplantation in general.

The basic phenomena worked out and the terminology used are these:

Graft		Take
Autograft	Within individual	+
Isograft	Within members of inbred strain	
	From one monozygotic twin to another	+
	These are genetically homogeneous	
Homograft	Between individuals of genetically heterogeneous population or between members of different inbred strains	—
Heterograft	Between members of different species	

On the basis of these findings, many further tumor transplants were done within and between different inbred lines of mice and their F₁ and F₂ hybrid offspring. The findings that were made were quite consistent and were formulated into a set of rules known as Snell's laws of transplantation, which are illustrated in table 1. These rules were derived from data on tumor

TABLE 1
SNELL'S RULES OF TRANSPLANTATION

1. Autotransplants succeed.
2. Isotransplants succeed.
3. Homotransplants fail.
4. F_1 hybrids will take F_1 tumors as well as tumors belonging to either parental strain. For example, ABF_1 animals will take A or B tumor, but parental strains A and B will not accept ABF_1 tumors.
5. Only a fraction of F_2 mice, or a backcross between F_1 to the resistant parent, will take the tumor from the inbred lines involved. The portion susceptible may be large or small depending on the tumor and the cross but rarely exceeds 75 per cent for the F_2 , and 50 per cent for the backcross.

transplantations, but they have been thought to hold for transplantation of normal tissues as well. They form the basis of the now generally accepted genetic theory of transplantation.⁶

According to this theory, susceptibility to a tumor is due to the presence in both recipient and donor of *multiple dominant genes*. These genes are called histocompatibility genes, and the sites on the chromosome where they are located are called histocompatibility loci. The available data permit only an approximate estimate of these loci in the mouse, the animal most thoroughly studied in this respect. The number of these loci is close to 10;⁸ it may be greater.

Linkage and crossing over between these histocompatibility genes can be demonstrated, and there are several allelic states at each histocompatibility locus. At the H-2 locus, for example, 12 alleles have been identified so far.⁸ All of those alleles are dominant genes, that is, all express themselves in the heterozygote. This is parallel to the situation found in the Rh genes and most of the other blood group genes in man.

The common underlying principle in tissue transplantation is that cells can be successfully transferred to a recipient who has *at least* all those isoantigens that are present in the transferred cells. As pointed out, the presence of these isoantigens is genetically controlled in a dominant fashion. Additional isoantigens in the recipient matter little, but if the donor cells possess an isoantigen *not* present in the recipient, the recipient will react by an immune response resulting in the destruction of the donated cells.

As mentioned before, the assumption, supported by some convincing evidence,^{9,10} has been made that the same genes that determine susceptibility and resistance to tumor transplants also determine susceptibility and resistance to normal tissue transplants.

However, some recent data involving skin homografts in mice suggest that the data on histocompatibility as derived from tumor transplantation cannot be applied uncritically to the transplantation of normal tissues. Eichwald and associates,¹¹ for example, have made normal skin transplants within and between certain strains of mice and their F_1 hybrids. Their data show that intrastrain grafts and grafts from pure strains to F_1 hybrids and from one F_1 hybrid to another F_1 hybrid generally succeed, *provided* donor and recipient are of the same sex or provided the donor is female and the recipient male. When the donor is male and the recipient female, grafts generally fail.

Failures of male grafts in female recipients suggest the existence of a histocompatibility gene on the Y chromosome of male mice. Since females (XX) lack the Y chromosome, while males (XY) carry both the X and Y chromosomes, a Y-linked gene would cause graft failure for the same reason that F_1 hybrid tumor cells are rejected by pure-strain parents and type AB erythrocytes are agglutinated by type A or type B recipients.

This work has been corroborated by several investigators,^{12,13} but others using different strains of mice did not obtain the same results. This putatively sex-linked histocompatibility phenomenon thus may be limited to certain strains.

Werder and associates¹⁴ also recently have supplied evidence which, if confirmed, would indicate that the generalization that the same genes determining histocompatibility of tumors also determine susceptibility and resistance to normal tissue transplants may have to be taken with reservations.

The points outlined have given an indication of the genetic basis of graft acceptance or graft rejection. Autografts and isografts take because of genetic similarity between the host and recipient and their corresponding similarity in tissue antigens. Homografts and heterografts do not take because of genetic dissimilarity and the resulting difference in tissue antigens. What is the underlying physiologic basis of homograft rejection? The reasons for homograft and heterograft rejection are basically immunologic in nature, that is, the graft is rejected because of typical immune reactions of the host resulting in rejection of the graft. Evidence for this is summarized in table 2 and elaborated on below.

The nature of the immune reaction involved has not been completely elucidated. There is much confusing literature on the subject. Antibodies have been described that are humoral in nature, but cell-fixed antibodies are also involved

TABLE 2
EVIDENCE FOR IMMUNOLOGIC BASIS OF HOMOGRAFT
REJECTION

1. Adoptive immunity.
2. Grafts take in regions unavailable to immune reaction.
3. "Second set" phenomenon.
4. Use of agents blocking the reticuloendothelial system (cortisone, x-rays, and so forth).
5. Data from work on acquired tolerance.
6. Graft-take during period of immune unresponsiveness (embryo, very young animal).

and are probably the more important. There is evidence that the rejection of a graft resembles the delayed hypersensitivity type (tuberculin type) of reaction more than the more classical antigen-antibody type of reaction. For example, mouse lymph nodes draining a rejected homograft can transfer immunity to other mice of the same strain.¹⁵ Transferred immunity is recognized by a premature breakdown of a test homograft (either tumor or skin). This phenomenon shows the ability of the transferred lymphatic tissue to react against the kind of tissue with which it had originally been immunized and has been termed "adoptive immunity."

Evidence that an immune reaction is involved in the rejection of homografts and heterografts comes from the following considerations. When such grafts are put into regions where they are unavailable to an immune reaction, such as the anterior chamber of the eye or the brain, the grafts will take. Additional evidence for an immune reaction comes from the observation^{16,17} that when an animal is subjected to a second homograft following the rejection of the first, the second graft is always rejected much more rapidly than the first. This phenomenon has been termed the "second set" reaction and indicates that rejection of a homograft sets up a state of immunity against subsequent transplants from the same donor.

Another piece of evidence comes from the findings that when agents are used which block the reticuloendothelial system, such as cortisone or x-rays, the animal so treated frequently takes the foreign graft. In this manner, the homograft and heterograft barriers can be circumvented, and human tissues, for example, have been successfully grafted onto laboratory animals treated with cortisone or x-rays.

A further exception to the rule that homografts and heterografts are rejected is found in the phenomenon of "acquired tolerance." It has been found by Medawar, Billingham, Brent, and

others³ that when animal A is injected during embryonic life with tissue from animal B and animal A is later transplanted with normal tissue or tumor tissue from animal B, it will accept these foreign grafts. This work was based on the hypothesis made by Burnet that an animal exposed to antigens during embryonic life will later on in its life always be unable to form specific antibodies toward that antigen. The phenomenon of acquired tolerance is a fact, but the explanations offered for it are still under dispute. They are frequently confused with the phenomenon called "immune paralysis," discovered by Felton and associates.¹⁸ They found that when an animal was swamped with an antigen (they used the mouse and pneumococcal polysaccharide as the antigen) the animal later proved unable to produce antibody against this antigen. It was found that this inability to produce antibody was due to the continued presence of antigen in the mouse, that is, antibody was produced all the time but removed by the antigen still present from the original injection. In the case of "acquired tolerance," it has also been found that it seems to work only when the tissue injected during embryonic life keeps proliferating. It may thus well be only a special case of a persistence of the antigen, which was found also in the case of "immune paralysis," and it is possible that both phenomena have a common denominator in the persistence of a foreign antigen resulting in the establishment of the tolerant state.³

It may be asked, Why does the embryo take foreign tissue in the first place? This is due to the fact that the embryo and also the very young mammal are in an immunologically unreactive state. For example, it is possible to make tumor homografts in day-old mice, and these mice will take the tumor and will eventually be killed by it. Yet, when the same homograft is made a few days later, it will be rejected.^{19,20}

It may be noted here parenthetically that the mammalian fetus, except in inbred stocks, is actually a homograft on its mother. This seems to supply one single, sufficient reason—an immunologic one—to explain why the blood systems of mother and child are separate.

Following the realization by workers in the field that the tumor immunity that often was found when genetically heterogeneous animal populations were used was simply due to iso-antigenic differences between the animals, a great attempt was made to use better controlled biologic material. This, as was pointed out, became possible with the advent of inbred populations. Unfortunately, and perhaps unavoidably, methodologic mistakes were made. It was gener-

ally assumed that members of inbred strains were as close to each other as monozygotic twins, and statements to that effect have frequently occurred in the literature. Due to this assumption, it was thought that if a tumor arose in a member of an inbred stock and was used to immunize another member of the same inbred stock, it was as if the animal had been immunized with "his own tumor." This basic assumption is not a fact, because in any inbred animal population a certain amount of genetic heterogeneity remains. This is due to the fact that (a) mutations occur, and (b) nature favors heterozygosity. Therefore, if a tumor from one member of an inbred line is taken and put into another animal of the same strain, any immune phenomena found may still be due to this very slight genetic difference between the animals.

Another disadvantage has been to use long-transplanted tumors for immunization purposes. Now tumors may change very rapidly, and a tumor in its seventieth or even a much earlier transplant generation may be considerably different from a tumor in its first transplant generation. For example, Hauschka and others^{21,22} have shown that as a tumor is being transplanted, it frequently changes from its near diploid state to an aneuploid state, that is, the basic chromosome number of the tumor cells changes. There are other changes, such as in growth rate, metabolism, and antigenic composition as well.^{6,23}

In a number of investigations, tumors that had originally been induced by carcinogens or tumors that had arisen *in vitro* from normal tissue in tissue culture were used for immunization. Such tumors are different antigenically from spontaneous tumors, and results, while suggestive, do not critically answer the question of whether spontaneous tumors also are characterized by tumor-specific antigens.

It has been shown clearly by Foley²⁴ and by Prehn and Main²⁵ that if a tumor was induced in mice by carcinogenic chemicals and this tumor was removed, immunity against this same tumor was present in the mice, while no immunity was obtained with spontaneous tumors under identical conditions. The same holds true of "in vitro tumors"—tumors that have arisen in the test tube from normal tissues in tissue culture.

That the isoantigens of the carcinogen-induced tumors were peculiar to the tumor tissues was demonstrated directly by Prehn and Main²⁵ by showing that, although implants of carcinogen-induced tumor could immunize isologous mice against subsequent implants of the same tumor, normal tissues from the very same mouse in which the tumor had been originally induced

could not immunize against the tumor. Conversely, it was also shown that implants of carcinogen-induced tumor tissue could not immunize isologous mice against skin grafts obtained from the very animal from which the tumor had originally been obtained. Apparently, tumor tissue, and only tumor tissue, could either elicit or respond to the isologous immunity. It is reasonable to conclude that the effective antigen or antigens were peculiar to and confined within the tumor tissues *per se* rather than shared with the other tissues of the animal of origin.

An antigen, called "antigen X," present in tumor and absent in the corresponding normal tissue, was described by Gorer²⁶ and by Amos and Day.²⁷ The tumor used, leukemia É.L.4 in C57BL mice, also was originally chemically induced. Similar tumor-specific "X-antigens" were demonstrated by Amos and Day²⁷ in three other leukoses, but these results were less clear-cut. Gorer²⁸ has found such "X-antigens" in three more chemically induced leukoses. Allusion to tumor-specific antigens in carcinogen-induced tumors would not be complete without mentioning, in addition, the circumstantial but convincing evidence of such antigens in long-transplanted tumors^{23,29,30} in tumor cells propagated for long periods of time in tissue culture³¹ and in tumors derived from normal cells originating *in vitro* in tissue culture.^{32,33} For a detailed discussion of the antigenicity of such tumors, see Hirsch.²³

It should be realized, however, that the *sine qua non* from the point of view of immunization against spontaneous tumors is to determine whether *spontaneous* tumors are characterized by such tumor-specific antigens.

The tumors that I have alluded to: namely, long-transplanted tumors, carcinogen-induced tumors, and "*in vitro*" tumors are thus all tumors that are subtly but demonstrably different from the tissue of the host in which they originally arose and even with respect to the inbred strain in which they originated. If such tumors are used for immunization, one is really dealing with homograft reactions rather than with isograft reactions, and it is thus not surprising that immunity is frequently obtained in the hosts into which they are introduced.

If such changed tumors represent a problem in homograft immunity rather than isoimmunity, why do they frequently grow well in their host of origin? I have just pointed out that homografts are normally rejected by their hosts. The answer to this apparent contradiction is that the mutated tumor grows in its strain of origin because, during long-extended periods of transfer,

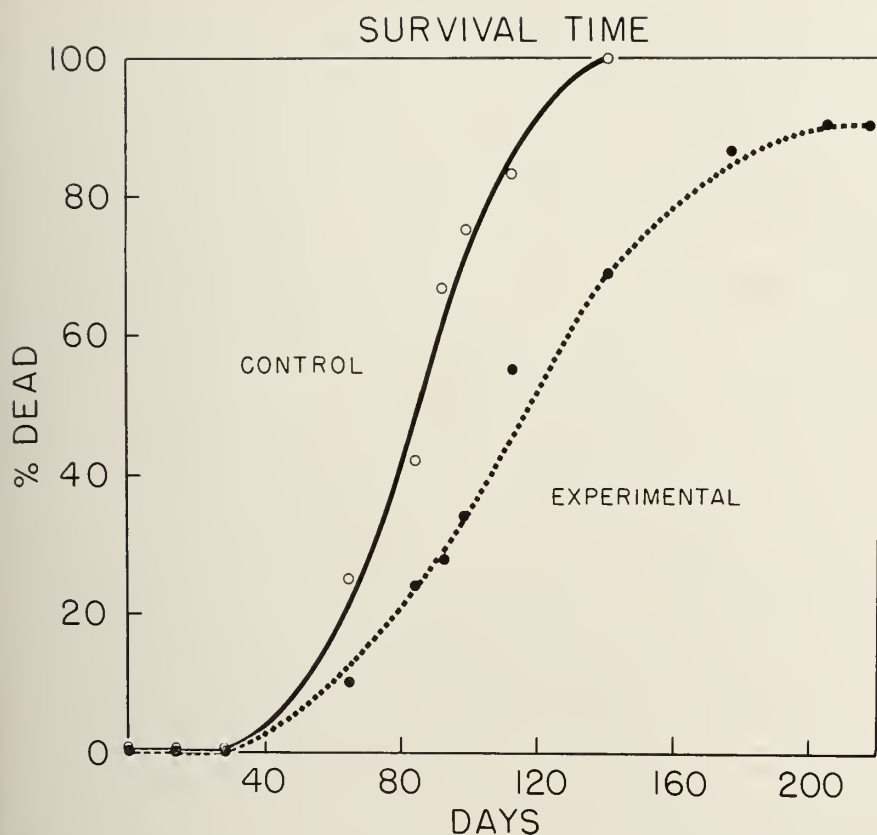


Fig. 1. Survival time of immunized and nonimmunized strain C (Bagg albino) mice following challenge with strain C tumor. Mean survival time for experimental group, 124 ± 8.7 days, for control group, 91 ± 7.3 days; $P = < 0.01$.

cell lines have been selected which have very great invasive power and growth potential and which are thus able to establish themselves before the immune response of the host comes into play. That this is true is shown by observations that it actually is easy to immunize against these tumors by appropriate methods which prevent the initial overgrowth of the host by the tumor.²³

During the last two to three years, numerous papers²³ have appeared in which it is claimed that inbred animals were immunized against "their own" tumors. Frequently, complete protection against challenge tumors following a course of immunization was obtained. However, all these papers are open to the objections made and thus do not critically test the hypothesis that spontaneous tumors are characterized by specific antigens. Experiments designed to test this hypothesis thus must be set up in a more controlled fashion.

One such experiment would be to immunize a high cancer line with *spontaneous* tumor of its own line and observe the animals in regard to what effect this active immunization will have on *spontaneous* tumor development. Experiments of this type are now in progress in a number of laboratories, but conclusive data have not yet

been obtained. Another suitable experiment is to approximate as closely as possible the approach just outlined by immunizing with transplanted tumor of *very recent* spontaneous origin and then challenge with the same tumor to see whether the immunization was of any value. In such a case, it is important that the mouse donating the tumor and the animals being immunized and challenged belong to closely related generations *within* the inbred strain to be used.

This experiment has recently been done, by immunizing strain C (Bagg albino) mice with an isologous strain C tumor of very recent spontaneous origin followed by challenge with the same tumor. Experimental details are described by Hirsch and associates.^{34,35} Some of the results are given in table 3. As can be seen, no significant differences in the total number of tumors or in the time at which they became palpable were found between the experimental and the control groups of animals. The immunized mice did show, however, a significantly longer survival time than did the control animals, as can be seen from figure 1, indicating that the immunization did have some effect.

The small but definite degree of immunity

TABLE 3
GROWTH OF CHALLENGE TUMOR IN IMMUNIZED AND IN CONTROL STRAIN C MICE.
FOR EXPERIMENTAL DETAILS, SEE ³⁵

Day following challenge	Experimental group		Control group		Percentage of mice with tumors		Percentage of mice dead of tumors		Survival time (Percentage of mice dead of total number of mice that had tumors)	
	Number mice alive	Cumulative no. mice with tumors	Number mice alive	Cumulative no. mice with tumors	Experimental	Control	Experimental	Control	Experimental	Control
0	38	0	14	0	0	0	0	0	0	0
14	38	4	14	2	11	14	0	0	0	0
28	38	14	14	6	37	43	0	0	0	0
64	35	24	11	12	63 [*]	86	8	21	10	25
84	31	26	9	12	68	86	18	36	24	42
91	30	26	6	12	68	86	21	57	28	67
98	28	26	5	12	68	86	26	64	34	75
112	22	27	4	12	71	86	42	71	55	83
140	18	27	2	12	71	86	53	86	69	100
175	13	27	2	12	71	86	66	86	86	100
203	12	28	2	12	74 ^{°°}	86	68	86	90	100
217	12	29	2	12	76	86	68	86	90	100

^{*}Difference between proportions of mice having tumors in the experimental and control groups on day 64 is not significant statistically; difference between proportions, 0.23; standard error of the difference between proportions, 0.15.

^{°°}Difference between proportions of mice having tumors in the experimental and control groups on day 203 is not significant statistically; difference between proportions, 0.12; standard error of the difference between proportions, 0.13.

Mean survival time in days \pm standard error of the mean, for mice with tumors
Experimental: 124 ± 8.7
Control: 91 ± 7.3
Welch's "t" = 2.89
with 41° of freedom
P = < 0.01

which has been achieved in these experiments brings up the vexing question of antigenic differences between tumor and homologous host tissue, which was alluded to before. The fact that a slight degree of immunity has been achieved would indicate that such small differences do exist. Such a conclusion must remain in doubt, however, in view of some cases of true auto-immunization recorded in the literature. How much this immunity may be due to slight genetic differences between tumor and host animals even in such a closely inbred strain as the one that was used also remains undetermined. The possibility of "nonspecific" stimulation of host defense reactions must also be considered. Despite these strictures, a slight amount of resistance in inbred mice against their own tumors of recent spontaneous origin was shown, and this, then, at least indicates that spontaneous tumors *may* contain antigens different from normal tissue.

Confirmation for this theory has recently come from a number of sides, including Isojima and associates,³⁶ Zilber,³⁷ and Grace.³⁸ The methods used by the latter two investigators are particularly interesting. They have employed the principle of sensitization and desensitization followed by anaphylactic shock. This is a good method to use to determine very small amounts of protein,

and both investigators apparently have succeeded in establishing the presence in tumor tissues of antigens not present in corresponding normal tissue. Gorer²⁸ recently found that a spontaneous tumor originating in his subline of C57BL seems to contain a tumor-specific antigen.

SUMMARY

The data presented indicate that there is some evidence that tumors are characterized by antigenic gain. On the other hand, there is also some quite good but still inconclusive evidence that tumors are characterized by *antigenic loss* rather than antigenic gain.

A great deal of biologic evidence has accumulated which points to the possibility that the cancer cell represents a somatic mutation by loss, and recent work appears to support the idea that this deficiency is genetic, antigenic, or enzymatic in nature. The possibility that combination of an azo carcinogen and an autotrophic protein could result in the gradual removal of this protein from the cell and its descendants has been suggested by the Millers.³⁹ They have pointed out that an autonomous tumor might thus arise from a permanent alteration or loss of proteins essential for the control of growth. In a specific case, Carruthers and Sontzeff⁴⁰ found that a polarographically reducible sub-

stance, characteristic of epidermis, is lost in the malignant transformation of this tissue by the carcinogen, methylcholanthrene. Weiler⁴¹ has found that certain carcinogen-induced tumors lacked normal organ-specific antigens, and the deficiency hypothesis has many points in common with the deletion hypothesis of Potter^{42,43} and with the immunologic loss concept put forward by Green.^{44,45}

There thus seems to exist reasonably good evidence that carcinogenesis is accompanied by antigenic loss and other evidence that it is accompanied by antigenic gain. How can we reconcile these opposing viewpoints? One way may be to assume that we are dealing with both—an antigenic *loss as well as an antigenic gain*.

At the present time, our knowledge is not sufficient to permit us to make a really valid judgment.

Tumor immunity and tissue transplantation are two very closely related fields; in fact, as was previously shown, most of our knowledge concerning tissue transplantation has come from the work on tumor transplantation and tumor immunity. It must be realized, though, that work with tumor transplantation has only a very tenuous relation to tumor immunity, that immunity against a transplanted tumor is not true tumor immunity, and that the only logical way to study tumor immunity is to find out how the course of *spontaneous* tumor development can be influenced by immunologic means.

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Peripheral Nerve Injuries

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THE STIMULUS conducting part of a peripheral nerve is the neuraxon. Its cell body lies in the anterior horn of the spinal cord in motor, or efferent, nerves and in the dorsal root ganglia in sensory, or afferent, nerves. Surrounding the neuraxon is a myelin sheath, and covering the myelin sheath is the neurilemmal sheath, or sheath of Schwann. A peripheral nerve is composed of bundles of these conducting units which are held together by a fibrous membrane, the epineurial sheath.

When a nerve is severed, certain changes occur:

1. There is degeneration of the neuraxon back (centrally) to the first node of Ranvier, a distance of 1 mm. or so. There is also degeneration of the entire neuraxon distal (peripherally) to the injured area.

2. The myelin sheath breaks down into free fat and other products, which, during a two- to four-week period, are partially phagocytized and carried away.

3. The cell body undergoes alterations in the chromatin pattern and staining properties. These changes are called chromatolyses.

4. The neurilemmal sheath diminishes in size so that at six months it is one-half normal and at one year it is about one-fourth normal size.

When a severed nerve is left unsutured, a neuroma forms on the proximal end of the nerve. This neuroma is composed of a tangled mass of downgrowing neuraxons imbedded in fibrous tissue. It usually is very sensitive to stimuli. It is painful when palpated. On the distal segment, an enlargement is formed which is composed of proliferating neurilemmal cells. This latter enlargement is, therefore, not a true neu-

roma but is ordinarily referred to as a neuroma.

The rate of regeneration of a nerve following a nerve suture is about 1 cm. per week. Therefore, if it is 10 cm. from the suture site to the muscle to be innervated, about two to three months will be required before function can return.

During the period of nerve regeneration, it is wise to give the patient physiotherapy. This should consist of passive motion, massage, and, possibly, faradic electrical stimulation. The passive motion should put the involved joints through a full range of motion so that periarticular fibrosis with joint fixation is held to a minimum. This therapy may also improve the blood supply to the muscles with a slowing down of atrophic changes. Skeletal muscle rapidly becomes atrophic after denervation. Loss of sarcoplasm and shrinkage of muscle fibers in cross section amounts to about 50 per cent within sixty days. True degeneration is slower, but eventually muscle fibers are almost completely replaced by fat cells. After this degenerative process, which takes perhaps twenty to twenty-four months in man, recovery of useful function in the muscle is unlikely. Therefore, an attempt should be made to get the downgrowing neuraxons to the motor end-plate by this time. Function in a sensory end-plate may be recovered at any time.

As nerves regenerate, reinnervation of muscles takes place serially in order of distance from the site of suture. Percussion over a regenerating nerve trunk distal to the site of suture will elicit Tinel's sign, a painful or tingling sensation. If the nerve is regenerating properly, Tinel's sign can be obtained 3 in. distal to the suture three months after the operation. Percussion at the suture site will produce a similar sensation if the operation has failed and a neuroma has formed.

Reinnervation of muscle can be detected four to six weeks earlier by electromyographic study than by clinical examination. Skin resistance

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tests may reveal the same data. Resistance to passage of an electric current between two electrodes placed on the skin is increased if the skin is dry. In denervated skin, the sweat glands do not secrete, so resistance is high. Progressive decrease in skin resistance indicates reinnervation.

TYPES OF NERVE INJURIES

Concussion of a peripheral nerve results from a sudden blow that does not destroy anatomic continuity. Nerve function returns spontaneously within a few minutes to a few days, and no specific therapy is necessary.

Contusion of a nerve causes structural changes, such as hemorrhage and edema. Usually, the swelling subsides and hemorrhages are absorbed within a few days or months and function returns. Sometimes, there is actual disruption of the axons. In this instance, regeneration and, hence, functional recovery may be incomplete. Occasionally, the trauma to the nerve causes sufficient bleeding and hematoma formation within the nerve trunk so that absorption is incomplete. In this instance, a *central neurofibroma* may eventually form and bar the regeneration of the disrupted axons. Closed nerve injuries generally should not be explored immediately. Immediate exploration should be done only if anatomic severance of the nerve is suspected, and this seldom occurs in a closed, or indirect, injury. But, in a closed injury, there may be total immediate loss of function. Then what is the best procedure to follow? Unless for some reason it is felt there is anatomic loss of continuity, it is best to wait three months and then, if no function has returned, explore the injured site. The length of time it is permissible to wait depends upon the distance from the injured site to the muscles to be reinnervated. As stated before, after a period of twenty to twenty-four months, recovery of useful function in a muscle is unlikely. Therefore, it is unwise to wait too long before exploration if the distance from the injured site to muscle is great, that is, over 15 to 18 in. If at the time of operation it is found that the nerve is not severed and electric stimulation of the nerve proximal to the injury fails to cause distal muscle contraction, the affected nerve segment should be excised. If functional loss, as demonstrated by this stimulation, is partial, advisability of resection depends upon the type of incapacity, the duration of time since the injury, and other individual conditions.

If only one side of a peripheral nerve is damaged, a *lateral neuroma* may form in the wedge-shaped space beside the nerve trunk. Total ex-

cision of the damaged segment and end-to-end suture is the only effective treatment but may not be worthwhile if the functional loss is relatively minimal or the duration of time from injury to operation does not favor a good result.

Laceration of a nerve trunk requires accurate approximation and suture of the ends without rotation. Suture should not be done in the emergency room or office but should be delayed until operating room conditions, excellent lighting, adequate anesthesia, and assistance are available.

There are a number of methods by which severed nerve ends can be united. The most practical is an epineurial to epineurial suture with very fine silk. Other substances that can be used are tantalum wire, human hair, and cotton. The techniques of plasma clot, arterial sleeves, and so forth are not applicable to general usage. When a nerve is united by epineurial to epineurial suture, only the epineurial sheath and not the underlying neuraxons should be included in the needle bite.

Length may be gained to overcome a defect in continuity by flexion of joints both proximal and distal to the suture line, by transplanting nerves, such as the ulnar, from posterior to anterior to the medial epicondyle, by gentle traction over a long period of time on the nerve, and by nerve grafting. The latter, however, is of very little value, for nerve grafts seldom function properly.

Division of a nerve trunk with loss of substance of the overlying tissues is treated in stages. Devitalized and contaminated tissue is debrided, and the nerve ends and bed are covered with a healthy layer of soft tissue. If necessary, a full thickness pedicle graft is employed. After infection is completely eliminated, terminal neuromas are excised with a sharp razor blade. This will leave a considerable defect (gap) in length of the nerves which must be overcome by mobilization of nerves, flexion of joints, or transposition of the nerves. After end-to-end suture, the extremity is immobilized, usually with a joint flexed, for two weeks to allow firm union. Then the joint is gradually straightened and the nerve is stretched. Nerves tolerate stretching up to 15 to 20 per cent of their length.

When a nerve cannot be repaired, tendon transplantation or arthrodesis may restore function.

Removal of a *cicatrix* compressing a nerve may greatly improve function after extensive soft tissue damage. After removal of the cicatrix, the nerve should be rerouted, if possible, so that it lies in a bed of healthy, unscarred tissue. Otherwise, the cicatrix may reform on the nerve.

Fluoroscopy and Radiography of the Chest

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MORE THAN SIXTY YEARS have passed since Wilhelm Konrad von Röntgen discovered roentgen rays. During that time, fluoroscopy and radiography have become an integral part of pulmonary diagnosis. Whereas, before, men relied upon their auscultatory and palpatory skills, now they view indirectly pathologic and physiologic changes in the chest. Radiography affords the detection, diagnosis, prognosis, and serial study of these changes, serving as a permanent, objective record to which one can refer at any time. Fluoroscopy offers a ready means of studying pulmonary dynamics and their relationship to chest disease. However, with the advent of nuclear medicine, ushered in by the dropping of the first atomic bomb, the medical profession and the public have become aroused over x-ray exposure and protection.

Geneticists and men of science and medicine in numerous reports to our government, to our profession, and to the public fear for the safety of future generations. They have imposed upon each of us an arbitrary lifetime exposure dosage of 10 r delivered to our reproductive systems. Based on animal and plant experimentation and on physical measurements and calculations of all known sources of x-ray exposure, their reports assert that any x-ray exposure of the gonads in the reproductive years, arbitrarily set at 0 to age 30, will result in an increased rate of gene mutation. The actual effect of irradiation on the individual is imperceptibly small and cannot be measured or detected. Perhaps, in large samplings of future generations, the subtle effects of constant, low dosage irradiation will manifest itself in the form of an increased incidence of congenital anomalies, disease, and a general change in the hereditary make-up of a race. Even then such changes may not be due to radiation exposure, since our population is constantly bombarded with drugs, newer forms of chemotherapy, and a multitude of chemicals which also enhance the rate of gene mutation.

Two generations have passed since the discovery of roentgen rays. Still there are no percep-

tible hereditary effects. The progeny of radiologists exhibit no higher incidence of abnormalities and disease than other comparable groups. Actuarial figures show that radiologists are prone to the development of leukemia and other blood disorders. Presumably, this increased incidence is due to prolonged, repeated, low intensity whole body irradiation, which, in recent years, has been markedly reduced by safer machines and better methods of protection. Some assert that the low average age of mortality for radiologists indicates the hazards of x-ray exposure. Others refute this argument by indicating that the average age of the radiologist is lower than that of other medical groups due to the youthfulness of the specialty. In view of the uncertainty of the hazards of x-ray exposure and knowing full well that a real hazard does exist, we cannot gamble with future generations. We must now assess our indications and methods of roentgen exposure in the light of information gained and possible danger to our patients and to ourselves.

Fluoroscopy of the chest offers an easy means of detecting pulmonary disease. It requires no special equipment other than the standard fluoroscope, which is cheaper and needs less maintenance than the average radiographic or combined radiographic-fluoroscopic unit. A darkroom and other ancillary facilities, such as cones, cassettes, and cassette holders, are not required. The fluoroscope provides a living, dynamic image of pulmonary function. Respiratory exchange, diaphragmatic excursion and limitation, pulsatile masses, and vascular changes are viewed directly. Rotation of the patient provides an image in all projections which can be reproduced permanently on spot film radiographs. Under the fluoroscope, contrast media can be introduced into the bronchi and distributed to the pulmonary segments. By localizing a lesion of the lung under the fluoroscope, one can determine which radiographic views will best show it.

The disadvantages of fluoroscopy are many. The average physician is unaware of them. Due to poor illumination during conventional fluoroscopy, the human eye perceives only 1 to 5 per cent of the roentgen ray photons received on the

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fluoroscopic screen. Detail smaller than 1 cm. may not be distinguished, tending to merge with adjacent structures. Small infiltrates, nodular densities, or even calcifications will be lost unless one is alerted to their presence by previous radiography. Competent fluoroscopy requires at least ten minutes of eye accommodation, including a few minutes in the dark or dimly lit fluoroscopic room. Red goggles worn outdoors, in sunlight, or while inspecting roentgenograms on a viewer do not permit complete accommodation. Fluoroscopy is a subjective impression based on skill, experience, visual acuity, eye accommodation, and degree of fatigue. In inexperienced or untrained hands, fluoroscopic impressions become less impressive and misleading; the interpretation of what is seen often becomes confusing; significant and insignificant detail may not be separated or even noted; and all problems of fluoroscopy become compounded.

Radiography of the chest, though costlier, offers a more sharply contrasting picture of pulmonary anatomy. Serving as a permanent record for future comparison or review, the radiograph of the chest affords a more objective, less momentary appraisal of pulmonary disease. In recent years, it has been shown that most fluoroscopic impressions, including those of pulmonary dynamics, can be aptly portrayed on properly taken radiographs. Inspiratory-expiratory films of the chest reveal diaphragmatic excursion, respiratory exchange, abnormally aerated or hypoventilated lungs or segments thereof, mediastinal shift, pneumothorax, atelectasis, or bronchial pathology. Lateral decubitus views indicate the presence of intrapulmonary effusion and distinguish encapsulated from unencapsulated fluid. Oblique, lateral, kyphotic, and lordotic views give additional information when needed. Using high energy x-rays in the range of 100 K.V., bony structures and subdiaphragmatic and upper abdominal detail can be appreciated without losing pulmonary definition. In short, radiography offers a comprehensive picture of thoracic structures suitably detailed so that objects as small as 1 mm. can be perceived and distinguished and pulmonary dynamics appreciated.

Regardless of the roentgen method, x-ray exposure of the gonads from birth through the reproductive years assumes prime importance. For the patient, x-ray exposure to other parts of the body in diagnostic radiology is not biologically or genetically significant. For the physician who uses the fluoroscope daily, any x-ray exposure is significant, since an accumulative, biologic effect occurs from repeated, whole body irradiation. This latter effect may produce trophic changes in

the skin or hematologic alterations if the insult is prolonged and sufficiently intense. Even under ideal conditions, roentgen exposure during chest fluoroscopy far exceeds that of radiography. The skin nearest the central beam receives a minimum of 4 r per minute. Comparable scatter dose to the gonads is from .015 r to .020 r. per minute. If included in the primary beam, the gonads may receive a dose of .5 to 2 r per minute. Unfortunately, the average physician is insufficiently versed in x-ray technology to know whether he is performing fluoroscopy under ideal conditions. His machine may be old and unsafe, and its x-ray output may be unknown or not recently measured. Though the settings may be fixed, this output can change with prolonged usage. The wider the fluoroscopic shutter openings, the smaller the person, and the higher the x-ray factors (kilovoltage and milliamperes seconds), the greater is the x-ray exposure of the gonads. In infants and small children during fluoroscopic examination of the chest, over 10 r may be delivered to the reproductive system, since most of the body surface will be exposed to the direct beam and the gonads are relatively superficial. One may seriously question the advisability of performing chest fluoroscopy in these people unless strictly indicated. In older people beyond the reproductive years, gonadal exposure is unimportant.

Many factors influence x-ray exposure of the reproductive system in chest radiography. A cone just large enough to include a 14 x 17 in. film reduces gonadal exposure 90 per cent. A 2 mm. aluminum filter placed near the target of the x-ray tube further reduces patient exposure without decreasing radiographic detail. These two devices, more than any others, assure safe exposure to the patient and practically eliminate any risk to the physician or his technician. In recent years, fast films, fast radiographic screens, and rapid film developers have further reduced x-ray exposure by reducing the time necessary for good radiographs. In some institutions, a lead screen protects the lower abdomen and pelvis during chest radiography. Under the best of conditions, the female gonads receive .0003 r during a conventional posterior-anterior film of the chest. Oblique and lateral views of the chest result in a slightly higher exposure due to increased roentgen factors. Because of their intra-abdominal position, the ovaries receive 5 to 10 times greater exposure than the male testes. Photofluorograms of the chest taken at the time of hospital admission or during chest survey programs give an exposure of .005 r to the gonads. In chest microfilming, the gonadal dose will be larger if a camera with conventional refractor

lenses is employed and smaller if Schmidt optics are used. It should be obvious that x-ray exposure to the gonads during conventional chest radiography is small and insignificant from a genetic point of view provided the reproductive system is not included in the direct beam. In infants and small children, the risk is greater. In adults beyond the reproductive years, the risk is negligible.

In order to derive the most information from the roentgen method employed and to minimize the radiation hazard to the patient, the doctor, and personnel, I recommend the procedures and precautions shown in table 1. These have been tried and tested by experienced radiologists and are discussed in the text, *A Practical Manual on the Medical and Dental Use of X rays with Control of Radiation Hazards*, prepared by the American College of Radiology.

Have the safety of all machines tested. See that obsolete, antiquated machines that are likely to be hazardous are discarded. The era of spark gaps, open cables, and unencased x-ray tubes has passed. Though these old machines gave yeoman service in terms of roentgen output and diagnostic radiographs and required little maintenance, their radiation hazards to the physician were insidious and incalculable. All machines should be grounded, the x-ray tubes encased in metal housings, the cables insulated so that the equipment is shock proof, and the x-ray beam so collimated that it emerges from only one point and does not disseminate throughout the room.

For chest fluoroscopy, the x-ray tube should be at least 18 in. from the patient. Measure the output of the fluoroscope in order to know that there is no excessive irradiation. The maximum roentgen exposure to the nearest skin of the patient should not exceed 10 r per minute. The eyes should be dark adapted for at least ten minutes before performing a fluoroscopic examination. The less dark adaptation, the less one sees, and the longer the fluoroscope is used in trying to see. Use a protective apron and gloves. The danger to the physician lies not in a single fluoroscopic examination but in repeated exposure from frequent, daily fluoroscopy. With modern apparatus and considering the relatively low density of thoracic structures due to lungs containing air, use of high x-ray factors is unnecessary. Seventy-five to 85 K.V. and 2 to 3 ma. should be sufficient. Increasing these factors significantly increases roentgen exposure to the patient and to the physician without offering significantly more detail. Remember that the eyes perceive less than 5 per cent of what

TABLE 1
PRECAUTIONS AND PROCEDURES FOR FLUOROSCOPY
AND RADIOGRAPHY OF THE CHEST

1. Have safety of all machines tested.
2. For chest fluoroscopy:
 - a. X-ray tube should be at least 18 in. from patient.
 - b. Roentgen output should be known and not exceed 10 r per minute.
 - c. Dark adapt eyes for at least ten minutes.
 - d. Use protective apron and gloves.
 - e. Limit actual fluoroscopy time to three minutes per patient per examination.
 - f. Machine settings should be 75 to 85 K.V. and 2 to 3 ma.
 - g. Use small fluoroscopic shutter openings.
 - h. Never include the gonads in the direct fluoroscopic beam.
 - i. Use special care with infants and children.
 - j. Fluoroscope only when indicated.
3. For chest radiography:
 - a. Use a properly fitted cone just large enough to cover a 14 x 17 in. film. For infants and children, use a smaller film and cone.
 - b. A 2 mm. aluminum filter should be in place next to the target of the x-ray tube.
 - c. Never include the gonads in the primary x-ray beam.

appears on the fluorescent screen. Limit fluoroscopy by using a clock that indicates or limits exposure time. For chest fluoroscopy, this time should not exceed three minutes. Use a small shutter opening. The shutter must never be opened completely, since this results in irradiation of a larger area of the patient's body and increases exposure to the patient and to the physician by increasing secondary irradiation and scatter. Furthermore, a small shutter opening enhances detail. Keep the primary x-ray beam away from the gonads. But, most important, have a reason to use the fluoroscope. Chest fluoroscopy should not be employed as a means of chest survey or as a screening device for detecting pulmonary disease. Radiographs are better for screening; the radiation hazard is less; and the detail is greater. If the radiograph is normal, do not employ fluoroscopy. Do not gaze aimlessly at the fluoroscopic image. When using the fluoroscope, the mind, the eyes, the hands, and the feet should work synchronously to give a proper impression of this image. In spite of obvious pathology, adherence to a routine tends to minimize erroneous impressions and yields the most information. Once the dynamics have been appreciated, take radiographs to give detail. Study these in the light of the fluoroscopic impression in order to gain final in-

terpretation and differential diagnosis of chest pathology. Special care must be exercised with infants and children, since the radiation hazard to them is greater. Employ fluoroscopy only when indicated.

For radiography of the chest, observe the following precautions. Use a properly fitted cone just large enough to cover the standard 14 x 17 in. film. This sharply limits the primary beam and improves film clarity by reducing secondary or scatter irradiation. In infants and small children, smaller films and cones should be used. The film should be large enough to easily include all thoracic structures. The cone should be large enough to just cover the film. In roentgen-ray studies of the chest, it is unnecessary and unwise to include the lower part of the abdomen and pelvis or much of the upper extremities or skull. Do not include the gonads in the direct beam of the x-ray. If included in the direct beam, the reproductive system should be shielded by a lead apron either placed across the lower part of the abdomen when the patient is recumbent or supported on a metal stand when the patient is upright. During the x-ray exposure, working personnel should stand behind a protective barrier or lead screen. If they stand unprotected in the radiographic room, significant secondary irradiation may reach them. Those who use a fluoroscope frequently or take several radiographs daily would be wise to wear film monitoring badges which indicate numerically the intensity of roentgen exposure reaching them. These badges can be rented inexpensively and should be worn exposed on the clothing. During fluoroscopy, they should be worn outside the lead apron. By being aware of x-ray exposure, bad roentgenologic habits can be recognized and new ones formed. The greatest deterrent to safe radiology is the repeat study. In some instances, this is essential in order to confirm or deny a pre-

vious suspicion. But a repeat study due to poor technology is a reflection upon the physician and his technician and adds needlessly to the accumulative exposure of all concerned.

SUMMARY

Radiography and fluoroscopy are the cornerstones of pulmonary diagnosis. Without them, diagnosis of chest diseases would be relegated to the nineteenth century. Those employing these modalities must be versed in their indications, contraindications, and limitations. They must have a working familiarity with x-ray machines and technics. The hazards of roentgen exposure are slow and insidious, yet can be lethal. Recent investigation indicates possible genetic changes produced by ionizing irradiation, which may not become manifest for many generations but which still become our liability. By observing a few precautions and knowing when to use the fluoroscope and when to take radiographs, we can obtain the maximum information with minimum risk to our patients, to ourselves, and to future generations.

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Erythema Nodosum

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ERYTHEMA has for some time been considered a disease "sui generis"¹ and a sign of other disease states. Increasing interest and careful observation of patients manifesting the signs of erythema nodosum seem to have led to more and more frequent classification of the skin lesions as a nonspecific manifestation of other diseases.

DEFINITION

Spink² described erythema nodosum as "a non-specific inflammatory reaction of the skin to a variety of bacterial, toxic, and chemical agents," characterized as an acute febrile illness with painful, nodular, erythematous lesions on the shins and forearms and by joint pain and malaise. Hilar adenopathy has been associated with these signs in a large number of cases but has not been generally included as an integral part of the syndrome.

CLINICAL APPEARANCE

Doxiadis³ described in detail the clinical course of erythema nodosum in children based on his observations of 100 cases. He stresses the fact that the rash is the predominant feature and the diagnostic feature. The other signs and symptoms: namely, fever, arthralgia, and systemic symptoms are variable.

The typical lesion of erythema nodosum is a bright red, raised, 8-ring oval or round area, varying in size from 1 to 5 cm. in diameter. The lesions are always present on the anterior surfaces of the tibiae but may also appear on the posterior aspects of the lower legs, the lateral aspects of the thighs, the extensor surfaces of the arms and forearms, and, rarely, on the face, lobes of the ears, and buttocks. The skin lesions are indurated and usually quite tender. Contiguous lesions may coalesce during the acute stage but, as the process subsides, are usually again distinguishable as distinct areas in one to three days. When the lesions are stabilized in an area, a palpable, localized, subcutaneous nodule develops rather than diffuse induration. After four to ten days, the bright red color begins to

darken, and the lesions may soften to suggest fluctuation,⁴ but suppuration never occurs. The color progresses to purple and blue, much as a hematoma, and finally takes on a brownish pigmented appearance which may be visible as long as two weeks after the blue color disappears. The subcutaneous nodule may disappear before the color fades or may persist for weeks after all discoloration has resolved. The total duration of the color changes, not including residual brownish pigmentation, seldom exceeds two weeks and may be as short as twenty-four hours.

Fever is of such variability that no typical course may be outlined. It may persist for several weeks at high levels or may be present only until the skin lesions appear and then return to normal.

Arthralgia is a fairly constant feature, but the joints never swell. Any apparent swelling is due to adjacent cutaneous lesions.

PATHOLOGY

Histologically, erythema nodosum is characterized by vascular dilation; pronounced edema of collagen; and, primarily, lymphocytic infiltration, largely perivascularly arranged in the middle and lower portions of the corium and to a lesser extent in the papillary and subpapillary portions of the skin.²

ETIOLOGY

Erythema nodosum, as previously indicated, has been considered a specific disease and a manifestation of other diseases or pathologic states. For convenience, these will be considered separately.

1. *Erythema nodosum as a specific disease.* There is little positive evidence at present to suggest strongly that this condition is a specific disease. In general, the evidence is that of exclusion of other known diseases which might serve as a precipitating factor. Nevertheless, Löfgren⁵ described 44 cases of erythema nodosum in which no evidence of tuberculosis or streptococcal infection was found. Seventeen of these 44 patients were found to have hilar adenopathy, and, in 9 of these, no other cause for the

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node enlargement could be found. For these, he coined the term "benign lymphoma."

Likewise, Johnson and associates⁴ of the Mayo Clinic, reported a series of 100 patients with skin lesions of erythema nodosum. In 30, no other disease entity was noted. In 9 of these patients, hilar adenopathy was noted, and, in 4 of 5 patients in whom follow-up was available, the hilar adenopathy was noted to disappear after the skin lesions cleared. They interpreted this to mean that erythema nodosum might be a disease "sui generis" with hilar adenopathy an integral part of the complex.

2. *Erythema nodosum and tuberculosis.* The relationship between erythema nodosum and tuberculosis has been repeatedly discussed in the medical literature for many years. Wallgren⁶ considered erythema nodosum to be a manifestation of tuberculosis in children in 95 per cent of cases. He expressed a belief that erythema nodosum was due to allergy to tuberculosis and was associated with conversion of the skin test. Löfgren⁵ found that tuberculosis was the significant causal agent of erythema nodosum in over half of his cases.

Spink² found evidence of active tuberculosis in only 1 of his 133 cases of erythema nodosum. He concluded that the association of the two conditions was rare in adults and that tuberculosis was the most common cause of erythema nodosum in children.

3. *Streptococcal infection.* In Spink's² study, streptococcal infection was found in a vast majority of cases. He was able to reproduce histologically identical lesions by the intradermal injection of an antigen prepared from the beta hemolytic streptococci cultured from many of his patients. Löfgren⁵ found that streptococcal infection was second only to tuberculosis as a cause of erythema nodosum. Favour and Sosman⁷ studied 155 cases, of which 80 per cent were accompanied by acute upper respiratory infections. In half of those in whom cultures were taken, beta hemolytic streptococci were recovered.

4. *Coccidioidomycosis and other mycotic infections.* Smith⁸ reported erythema nodosum in about 5 per cent, or 423 cases, of a series of about 8,000 cases of coccidioidomycosis. All cases were associated with the so-called "valley fever" type of infection characterized by a flu-like prodrome of one to three weeks, followed by the appearance of the lesions of erythema nodosum lasting one to five weeks and clearing completely. In none of his 423 cases was there progression or

dissemination of the disease. Nuttal-Smith⁹ recently reported a case of pulmonary histoplasmosis accompanied by the lesions of erythema nodosum in a child 13 years of age.

5. *Sarcoidosis.* Löfgren^{10,11} reported 212 cases of histologically and clinically proved cases of pulmonary sarcoidosis. In 113 cases, erythema nodosum was present. He thought that the prognosis of sarcoidosis was better in those patients with the lesions of erythema nodosum, apparently because the disease was in an earlier stage. James and associates¹² presented a series of 27 cases of sarcoidosis in young adults, 17 of whom had polyarthritis. They too found a good prognosis for sarcoidosis in the presence of the erythema nodosum skin lesions, since hilar adenopathy completely resolved in 15 of their 17 patients within one year.

6. *Miscellaneous conditions.* Poppel and Melamed¹³ reported 6 of 88 cases of erythema nodosum associated with ulcerative colitis.

Rollof¹⁴ found a significant per cent of tuberculous children treated with sulfathiazole for an infection other than tuberculosis. He concluded that sulfathiazole might act as a provocative agent in bringing out the lesions of erythema nodosum.

Johnson and associates⁴ listed sensitivity to sulfonamides or to bromides as the apparent cause of erythema nodosum in 15 of their 100 cases. In addition, 47 per cent of their cases were due to nonspecific causes, including carcinoma, sarcoma, nonspecific upper respiratory tract infection, meningococcemia, bronchiectasis, and dental infections.

TREATMENT

Treatment in general should be directed toward the underlying disease process when this is apparent. Salicylates are ordinarily satisfactory in controlling the fever and discomfort of the skin lesions. Bed rest has been noted to shorten the duration of these lesions.

A case of erythema nodosum has been reported in which complete remission of the skin lesions occurred with no recurrences after two months of treatment with cortisone. The lesions, which had been present for several weeks and had failed to respond to salicylates, antihistamines, and aminopyrine, subsided promptly after the institution of steroid therapy.¹⁵

Caution should be exercised, however, in prescribing steroid therapy in a self-limited condition, which is so often associated with potentially severe infectious diseases.

CASE REPORT

History. An 81-year-old colored man retired from his job in Minneapolis and started on a trip to California on June 22, 1958. He arrived in Stockton, California, several days later. He remained there for several days and then traveled by train to Riverside, California. He started for home on July 6, 1958, and on July 7 became ill with nausea and vomiting and generalized malaise. He returned to Minnesota on July 9. Malaise continued, and several days later he noted the appearance of tender red areas on his shins. He consulted his private physician who treated him with "shots" weekly with no improvement. On August 11, 1958, he was admitted to Veterans Administration Hospital, Minneapolis, with continued complaints of fever, malaise, minimal cough, and "red spots" on his lower legs. He stated at that time that he had lost approximately 7 lb. in the preceding month.

Physical examination. The patient was a thin, elderly, colored man who did not appear to be seriously ill. Blood pressure was 110/70, temperature 99.4° F., and pulse 110. The lungs were clear to percussion and auscultation, and the heart was normal except for a sinus tachycardia. The abdomen was flat and soft. No organs were palpable. Several well circumscribed areas of induration were noted on the anterior and lateral areas of the lower legs. In some areas, there was a suggestion of fluctuation.

Laboratory. White blood count was 9,300, neutrophils 74, lymphocytes 17, monocytes 3, eosinophils 5, and basophils 1. Hemoglobin was 10.5 gm. Erythrocyte sedimentation rate was 85 mm./hr. Urine was negative. A chest roentgenogram revealed a fibronodular infiltrate involving the left upper lung field suggestive of a chronic inflammatory process rather than a neoplastic process. Six sputum smears were negative for tubercle bacilli. One of 3 sputum smears was positive for *Coccidioides immitis*, which was subsequently cultured from this specimen. Skin tests for tuberculosis and histoplasmosis were negative. A coccidioidin skin test was positive. Serologic tests for fungi were as follows: complement fixation test for histoplasmosis with whole yeast phase antigen was 1:8; histoplasmin test was negative; and the test for blastomycosis with yeast phase antigen was 1:16 and for coccidioidin 1:64.

Hospital course. Since admission to the hospital on August 11, 1958, the patient ran a hectic febrile course with daily elevations of temperature to 103° F. or thereabouts. He lost 5 lb. in the first three weeks after admission and then maintained his weight. He began to complain of pain in the left shoulder, but roentgeno-

grams of the area were negative. Bone marrow aspiration and lumbar puncture have failed to reveal evidence of dissemination of the disease. The erythema nodosum lesions have cleared, and only some residual pigmentation of the skin in the involved areas remains.

CONCLUSIONS

The lesions of erythema nodosum are manifestations of a large number of apparently unrelated diseases. A few cases have been reported in which no other underlying disease has been found. However, the overwhelming evidence tends to indicate that erythema nodosum is a nonspecific response to a variety of noxious stimuli and that the fact that no other disease is found does not necessarily mean that one is not present.

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Neglected Hearing in Children

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IMPAIRMENT OF HEARING in children appears to us as otologists to be frequently neglected. The child is usually not aware of any hearing loss. The parents may not note the loss, attributing the child's indifference to lack of attention, or perhaps the parents do not wish to recognize the true significance of the child's inattention or failure to respond to a command. Many times the parents condemn themselves for this failure, but, just as often, the family physician is consulted, who, after a cursory examination, states, "There is nothing wrong with your child's hearing," or may say, "There is such a slight loss of hearing, time will take care of it, and the child will outgrow this hearing loss."

As physicians, it is our duty to screen carefully all children with an ear difficulty, whether it is a complaint of an ear infection, an impairment of hearing, lack of attention, or poor speech development. Infections of the ears produce a loss of hearing which may persist and, not infrequently, become worse. A loss of hearing not detected may severely handicap a child and materially affect his future.

Prevention of a hearing loss is as vital as is the correction or treatment of an established impairment of hearing. All children with ear infections should be treated and the infection cleared. At this time, it is advisable to check the hearing and not neglect any possible loss of hearing. The following discussion and case reports illustrate the necessity of careful examinations and treatment.

TYPES OF OTITIS

1. *Secretory otitis, catarrhal otitis, or serous otitis.* This condition is common in daily practice and frequently is not recognized even by the otologist. Frequently the child has no particular complaint but many complain at times of a mild ringing, "clicking," or "blocked" sensation of the ear.

The parents may have noted the rather rapid development of an impairment of hearing. This low-grade infection usually follows an upper

respiratory infection and the contributing cause is most often a disturbance of function of the eustachian tube secondary to adenoid hypertrophy, infection, or allergy. An examination will disclose fluid in the middle ear. There may be bubbles of air in the fluid. The middle ear may be partially filled showing a distinct line of demarcation across the drum, or the middle ear may be completely filled, producing a glary, watery appearance in the drum. The ear drum may appear normal with no evidence of fluid in the middle ear. The fluid that is present in the middle ear is of a serous nature, most often straw or yellow colored and is generally sterile on culture.

Fluid in the middle ear produces a conductive type of deafness, which clears upon removal of the fluid. In cases of infection of the upper respiratory tract or of the ears, antibiotics are indicated and should be given until the infection is cleared. If allergy appears to be the exciting cause, appropriate allergy therapy, including antihistaminic therapy, should be given. At the onset, conservative treatment is in order followed by an adenoidectomy when indicated. The fluid must not be allowed to remain in the middle ear. If the aforementioned measures fail to clear it, either aspiration of the fluid with a syringe and needle or a paracentesis of the drum with suction to remove the fluid should be done. This fluid may be removed at the time of the adenoidectomy when the patient is under general anesthesia, or, with a cooperative patient, the fluid can be removed under a local anesthetic. Occasionally, the fluid recurs, and, in such instances, we advise the insertion of a small polyethylene tube into the middle ear through an opening in the drum. This tube is nonirritating and must be left in place until no fluid remains in the middle ear, usually a matter of several days. We have left the tube in place as long as four weeks.

Searing, retraction of the ear drum, and a conductive deafness are irreversible changes which result if the fluid is not removed or is allowed to recur.

Case 1. This 12-year-old boy had completely lost his hearing in the left ear before we saw him. At the time of his first visit, he complained of a loss of hearing in

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the right ear. Three weeks previously, a head cold had developed and his right ear felt "stuffy." He had no pain, but when he blew his nose, there was a "clicking" in the right ear. For ten or twelve days, he had noted an increasing impairment of hearing in his right ear.

Examination revealed a congested nose, considerable discharge in both nostrils and in the nasopharynx, and a moderate mass of adenoid tissue encroaching on the eustachian orifices. The right ear drum was intact and had a yellowish, watery appearance. The middle ear appeared to be filled with a yellowish fluid. An audiogram (figure 1) showed a loss of hearing in the right

ear. This patient was put on antibiotic therapy. The fluid was removed from the right ear; the adenoids were removed, and the hearing returned to normal.

A catarrhal otitis media of the right ear had developed in this patient due to an acute infection superimposed upon chronic adenoiditis. This boy, who could hear with only one ear, could ill afford a hearing loss in that ear.

2. Acute otitis media. Acute infections of the middle ear most frequently are preceded by an acute upper respiratory infection and should readily respond to modern methods of therapy.

In all patients with an earache, the auditory canals must be examined and cleaned, and a possible external otitis must not be overlooked. It is not sufficient to make a diagnosis of acute otitis media without a careful examination of the ear drum. The bulging ear drum should have a paracentesis (a wide incision) to (1) provide adequate drainage, (2) relieve pain, and (3) obtain a culture. The latter is important not only to identify the offending organism but also to test the sensitivity of the organism to the various antibiotics. The most commonly found organism is the streptococcus. Adequate chemotherapy or antibiotics should be given until the infection has completely subsided, a minimum of five to seven days. A hearing loss often results from inadequate therapy, and the hearing should be checked both during and after treatment.

Case 2. This is a child 4 year of age in whom an acute infection of the left middle ear developed. An audiogram (figure 2) showed normal hearing in the right ear, and approximately a 35 decibel loss in the

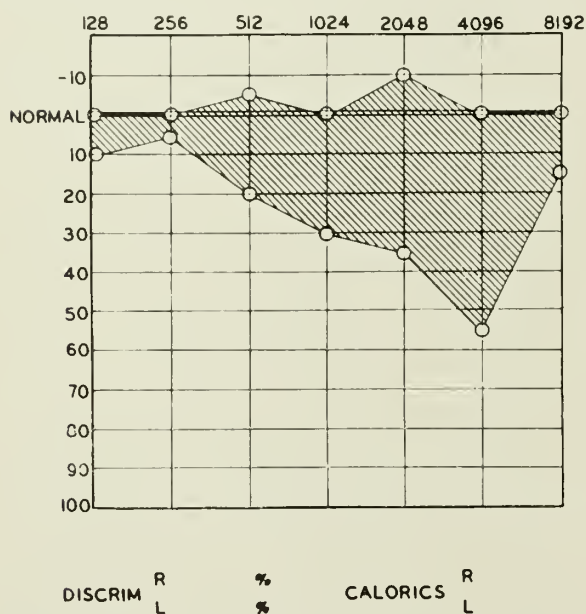


Fig. 1. Case 1. Catarrhal otitis of the right ear. Shaded area shows improvement of hearing in the right ear.

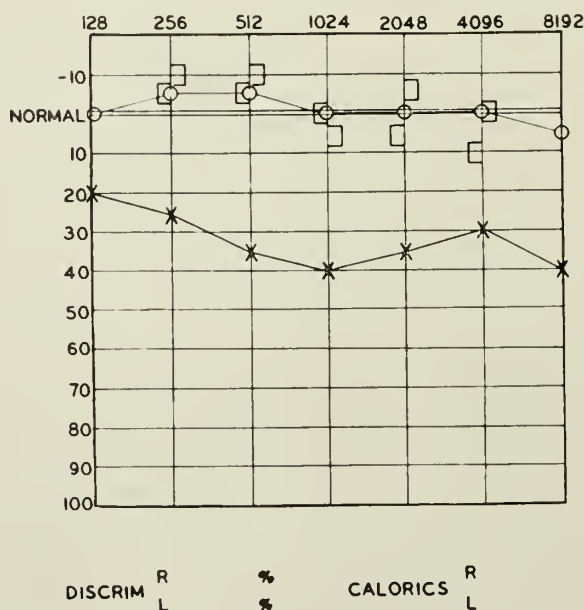


Fig. 2. Case 2. Acute otitis media of the left ear with conductive deafness.

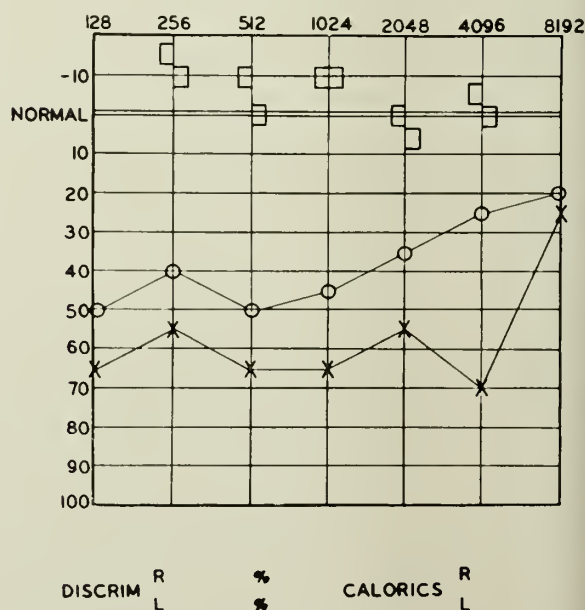


Fig. 3. Case 3. Bilateral conductive deafness due to chronic otitis media.

left ear. Adequate therapy cleared the infection, and the hearing returned to normal.

3. *Chronic otitis media.* This condition follows acute middle ear infections which have been neglected or inadequately treated. Many chronic ear infections discharge for years with perhaps only a loss of hearing; yet, many others are dangerous both to health and to life. The old saying, "Ears should run; if they are dry, they are dangerous," is absolutely erroneous. All chronic ear infections should be treated and made dry whenever possible. In the examination, careful note of the character and amount of discharge should be made and the drum carefully examined. It is necessary to determine the size, location, and extent of the perforation of the drum. The middle ear must be inspected for mucous membrane changes, presence of granulations, or for cholesteatoma. It is my feeling that all children with a chronic infection of an ear should be under the care of a competent otologist.

Case 3. This 9-year-old girl had had intermittent drainage from both ears since early childhood. For five years, the right ear remained dry, but the left ear continued to discharge. When seen, the right ear drum was intact, scarred, and markedly retracted. The left auditory canal was filled with a foul, purulent discharge. The left drum was destroyed, and the middle ear was filled with cholesteatoma. Roentgenograms of the mastoid revealed a large area of destruction of the left mastoid. An audiogram (figure 3) showed a bilateral conductive deafness. A radical mastoidectomy performed on the left ear produced a dry ear with no improvement of hearing.

In this case, a radical mastoid operation was necessary to clear a dangerous infection of the middle ear and mastoid. The chronic infection resulted in a destructive process dangerous to health and likewise produced a marked conductive deafness. Would this child not have been better advised to have had adequate therapy earlier?

Case 4. This 9-year-old boy was seen on March 24, 1958, complaining of recurrent ear infections and a loss of hearing. At 18 months of age, bilateral draining ears developed which cleared only to recur at irregular intervals. Tonsils and adenoids had previously been removed, but the infection recurred. Examination revealed large perforations of both ear drums. The middle ears were clean. Adenoid tissue was noted in the nasopharynx. An audiogram revealed a bilateral hearing loss. Roentgenograms revealed small, dense mastoids with little pneumatization. An adenoidectomy was done to remove a focus of infection. On June 27, 1958, a tympanoplasty was performed on the right ear. It healed well and resulted in a dry ear. On August 18, 1958, an audiogram (figure 4) revealed improved hearing with only a 5 decibel loss remaining in the right ear.

These two cases of chronic otitis media reveal the conductive hearing loss produced by a persistent or recurring chronic infection of the middle ears. In one case, a radical mastoidectomy

was done to clear the infection, but the conductive deafness persisted. In the second case, a tympanoplasty produced a dry ear and an improvement of hearing.

Hearing impairment in children is a very common, easily detected complaint, which, in the young child, may be overlooked or unrecognized. In our clinic, approximately 5,000 hearing tests per year are done, and about half of these are given to children. In an analysis of some of these cases, more than 50 per cent showed a conductive loss; about 25 per cent had a nerve loss; approximately 5 per cent had a congenital hearing loss; and the remaining few patients had normal hearing at the time they were tested.

"Has my child normal hearing?" "Why cannot my child talk?" "Why is he slow in developing speech?" "Why isn't my child doing well at school?" These are questions most frequently asked by the parents. Occasionally, the parents may wonder if their child is mentally retarded. These parents are seeking and need help for their child. An accurate diagnosis and proper therapy are the two problems facing the physician. The family physician is often the first person whom the parents contact and the one in whom they have the most faith. It is for him to decide whether or not the child has a hearing loss. A referral to a competent otologist may be the answer; perhaps, however, a physician may prefer to make his own examination. If so, the question arises as to just what this examination should involve. Frankly, the elementary testing with a few spoken words or whispers or a watch tick is no better than no test at all.

In the first place, one must be prepared to devote a considerable period of time to the child. A detailed history should first be taken, with inquiry in regard to any family history of deafness. With the child of 2 or 3 years of age, we must inquire about the pregnancy, the delivery, and the child's development and find out whether he has been cyanotic or had a high temperature. In all children, one must investigate childhood diseases, and, in the older age group, questions must be asked about upper respiratory infections, injuries, and ear infections as well as the drugs that have been used. Naturally, a careful scrutiny of the ears, nose, throat, sinuses, and nasopharynx should follow.

A careful appraisal of the hearing in each ear separately should be done in a quiet room with the child at ease, preferably busy with playthings. The examiner may then introduce a sound, using in turn at various intensities and distances such things as a drum, cricket, horn, or bell. One soon learns to know the distances

and intensities of sound produced by each instrument as heard by the child with normal hearing. With a little practice, an accurate or fairly accurate estimate of the afflicted child's hearing can be made. It is my personal feeling that an audiometer is not necessary and probably should be used only by the otologist or in an audiologic clinic.

Once the diagnosis of impaired hearing is made, we feel that the child should be referred to a competent otologist or an audiologic clinic where further examinations and studies may be carried out. Not all otologists have the necessary equipment to test properly all deafened children, but audiologic clinics now function in every state.

When a child with a probable hearing problem is referred to us, we proceed, as previously mentioned, first with a detailed history of past and present illnesses. Then a complete examination of the ears, nose, sinuses, and nasopharynx is given. Last—but not least—speech and hearing tests are given using only various noise mak-

ers, such as bells, crickets, drums, and so forth, or, possibly, a psychogalvanometer skin reaction test is performed. Depending upon the child and his reactions, we use any one or a combination of these tests. Testing is usually done in a sound-treated room, and both ears are tested separately. Free-field tests are also used. Many of the children present complicated problems. Frequently, we must decide whether or not there is a hearing loss or whether, in addition, the child's difficulty may be caused by a brain injury, mental retardation, or a psychologic disturbance. When indicated, the pediatrician, psychologist, or the neurologist is consulted.

Children in the 2 to 3 year age bracket generally present a special problem. The parents note that they fail to respond to sound and to develop speech. These youngsters usually have a congenital nerve deafness, most often profound. They are tested with noisemakers and psychogalvanometer skin reaction tests to determine what degree of hearing, if any, may exist.

Case 5. A psychogalvanometer skin reaction test (fig-

Fig. 4. Case 4. Bilateral conductive deafness. Dotted line shows improvement of hearing after a tympanoplasty was performed on the right ear.

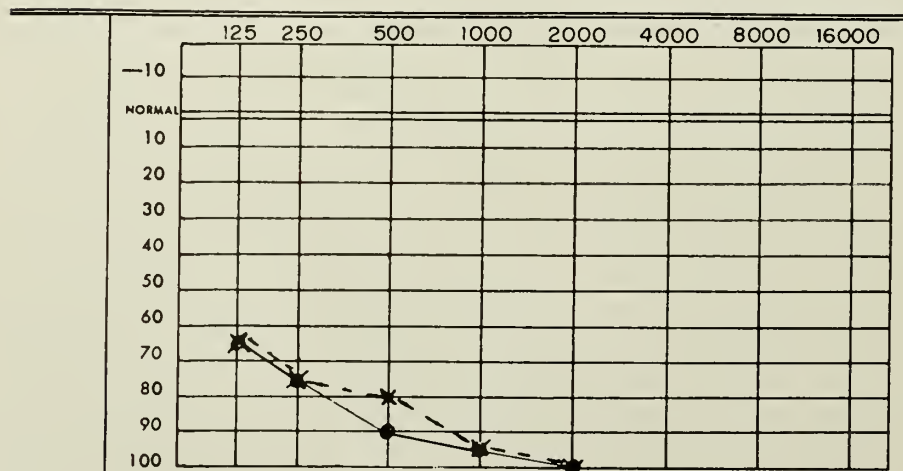
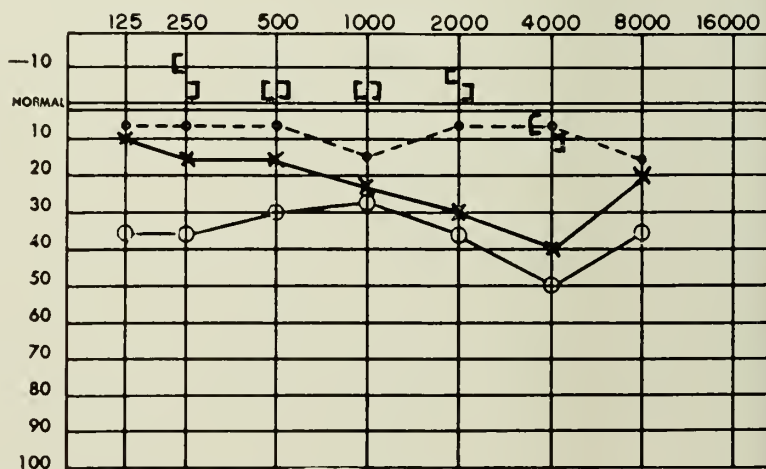


Fig. 5. Case 5. Psychogalvanometer skin reaction test of a 2-year-old child.

ure 5) of this 2-year-old girl showed a response at very high intensity for 5 pure tones. This child cannot hear the spoken voice. The tones which are heard, however, can be utilized in her education, which should begin at the age of 3 years.

The child 3 years old or older has usually developed some speech and is less of a testing problem, usually responding to careful pure tone audiometric, speech, and tuning fork tests. Each ear is tested separately with pure tones, and, in addition, monitored and recorded speech are presented through ear phones and in a free field.

The history, examinations, and consultations, together with the various hearing tests, furnish the data for diagnosis, and the type and extent of the hearing loss can then be determined. A nerve type of hearing loss reveals a loss of both air and bone conduction to the same degree. A conductive hearing loss shows a normal bone conduction with a decrease of air conduction. The studies should also determine cause of the hearing loss and give a clue to proper therapy.

Therapy in all cases must be directed toward restoration of hearing to as nearly normal a level as possible. Each type of hearing loss, of course, requires its own specific therapy. Experience and judgment must be exercised in each case.

There is no therapy of which I am aware that will improve a nerve type of hearing loss. It is inexcusable, however, to tell a parent, "Your child is deaf and we can do nothing." The parents must realize that they have a handicapped child and must likewise be given encouragement and support. Language development, including speech therapy; lip reading; auditory training; special education; and, in suitable cases, proper fitting of a hearing aid must all be considered.

In the case of a preschool child with a nerve type of hearing loss, the parents play an important role in the child's training program. We fre-

quently recommend that, if local parent counseling is not available, the parents enroll in the John Traey correspondence course and subscribe to the *Volta Review* and, with these aids, begin the child's training. School placement at an early age (in Detroit, 3 years) is advisable. The child's progress will depend upon his degree of hearing loss and his innate ability.

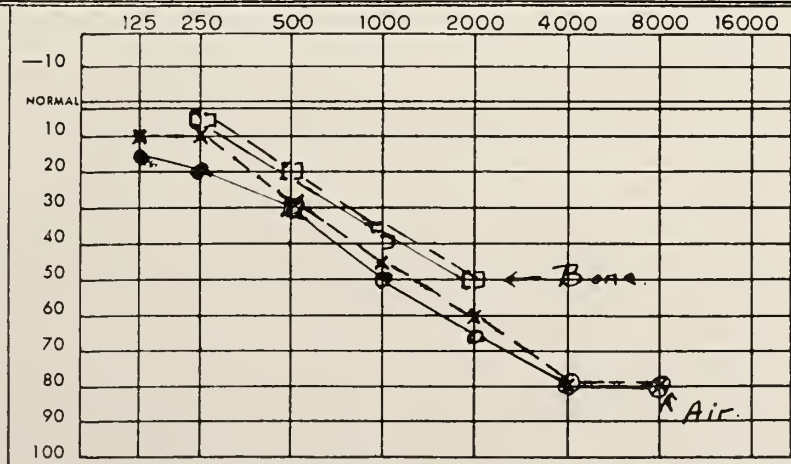
The school-age child with a nerve type of deafness should be given some special attention, such as preferential seating in the classroom, lip reading, and auditory training. Many of these children can use hearing aids, and I believe the majority can be fitted satisfactorily. The decision as to whether or not a hearing aid should be fitted, however, should be made by a competent otologist or audiologic clinic.

In addition, children with impaired hearing should be taught to read, using a dictionary at the same time. As the dictionary gives the pronunciation of the word as well as its definition, the child is able to recognize more readily each new word that he hears.

Case 6. A girl aged 5½ years in whom a hearing loss was noted at the age of 3 years had a history of previous ear infections. The ear drums had been opened at 18 months of age. Tonsillectomy and adenoidectomy had been done without improvement in hearing. Our examination revealed a scarred right ear drum. The left drum was opaque and thickened. An audiogram (figure 6) showed a hearing loss for both air and bone conduction, much greater for the high than for the low tones. This child with a selective nerve deafness could not use a hearing aid. Preferential seating in school and auditory training were advised.

Children with a conductive type of hearing loss offer us our best opportunity of preventing and correcting impairment of hearing. The cause of the hearing loss should be searched for diligently and eliminated if at all possible; infection of the ears should be completely cleared

Fig. 6. Case 6. Bilateral nerve deafness in a 5½-year-old child.



with adequate therapy; perforations of the ear drums should be closed; chronically infected tonsils and adenoids should be removed; infections of the sinuses, foci for recurrent otitis media, should be treated; hypertrophied lymphoid tissue around the eustachian cushions should be eliminated by x-ray or radium therapy; and allergic therapy should be given when indicated.

The following examples of conductive hearing losses demonstrate the improvement that followed therapy.

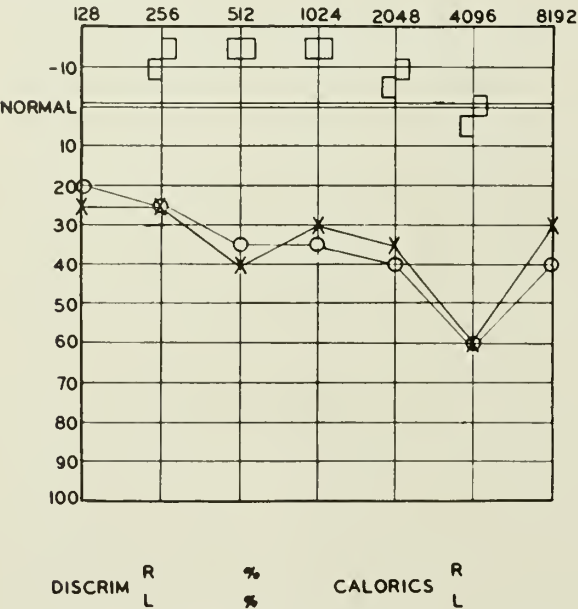


Fig. 7. Case 7. Conductive deafness in a 7-year-old child.

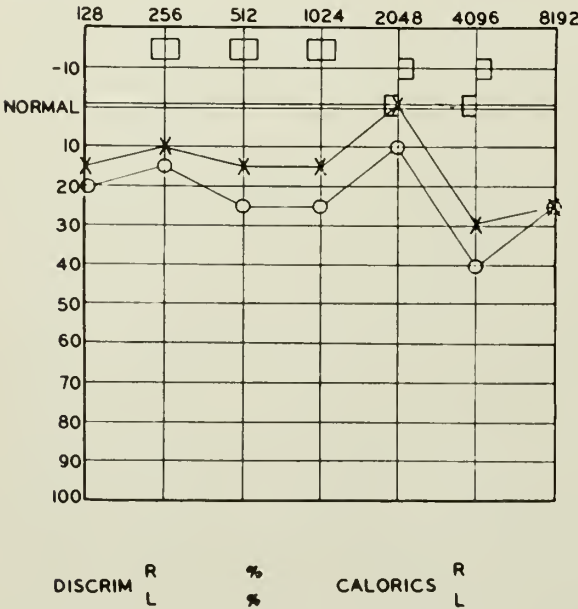


Fig. 9. Case 8. Bilateral conductive deafness.

Case 7. A 7-year-old boy was seen complaining of a hearing loss. He had a history of a stuffy nose, mouth breathing, and repeated earaches. Tonsillectomy and adenoidectomy had been done at the age of 3 years. An audiogram (figure 7) showed a 35 decibel hearing loss. Examination revealed tonsil tags and a large mass of adenoid tissue. Tonsil tags and adenoids were removed. An audiogram (figure 8) showed return of hearing to normal.

Case 8. This girl had had repeated earaches. Tonsillectomy and adenoidectomy were done two years previously. When seen by us, her complaint was a hearing loss. The audiogram (figure 9) showed about a 15 decibel

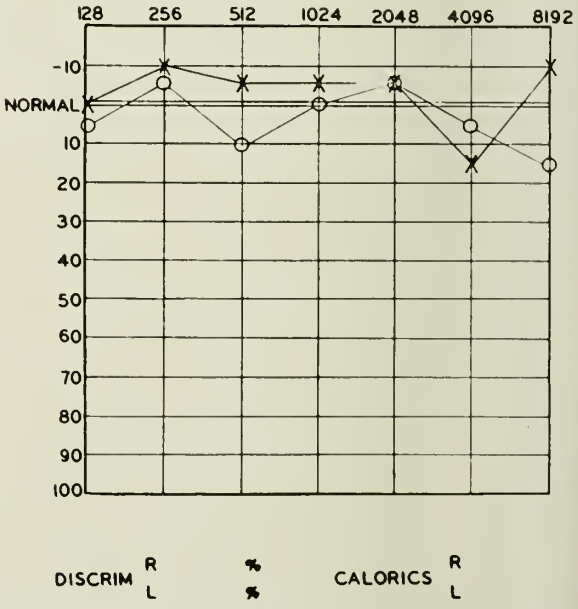


Fig. 8. Case 7. Normal hearing after a tonsillectomy and adenoidectomy.

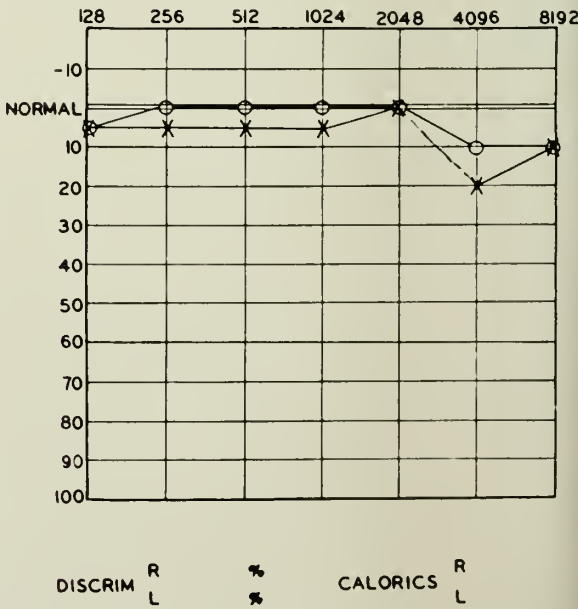


Fig. 10. Case 8. Normal hearing following x-ray therapy.

bel loss in the left ear and about a 20 decibel loss in the right ear. Examination of the nasopharynx disclosed hypertrophied lymphoid tissue on and around the eustachian orifices. She had three x-ray treatments. A later audiogram (figure 10) showed normal hearing.

Case 9. A 7-year-old boy was seen because of a hearing loss which was noted in school. Tonsillectomy and adenoidectomy had been done six months previously. Examination revealed a stuffy nose and adenoids. The audiogram (figure 11) disclosed a hearing loss of 25 decibels in the left ear and a 40 decibel loss in the right ear. An adenoidectomy was done. An audiogram (figure 12) following the adenoidectomy showed improved hearing, but he still had a 10 decibel loss in the right

ear and a 20 decibel loss in the left ear. The stuffy nose persisted. He was then given a course of antihistaminic therapy, after which his hearing returned to normal. An audiogram (figure 13) showed normal hearing.

CONCLUSIONS AND SUMMARY

1. Impaired hearing may be noted at any age.
2. There are two types of hearing loss—the nerve, or perceptive type, and the conductive type. The former may be congenital or acquired.
3. The nerve type of hearing loss cannot be improved. Special education and amplification as indicated should begin at an early age.
4. The conductive type of hearing loss is preventable and should respond to therapy.
5. In the small child, we must differentiate among impaired hearing, mental retardation, language disturbance as a result of a mild brain injury, and psychologic factors.
6. Audiometric tests may be given successfully at 3 years of age; others may be given earlier.
7. The majority of children with a moderate hearing loss can be fitted with hearing aids.
8. In children with a nerve type of deafness, hearing aids should be advised by a competent otologist or audiologist.
9. Practically all children handicapped by a hearing loss can be helped either by medication, surgery, or educational means or by any combination of these measures.
10. The results should be as good as the otologist. His careful examination and tests, his accurate diagnosis, and his therapy should produce satisfactory results.

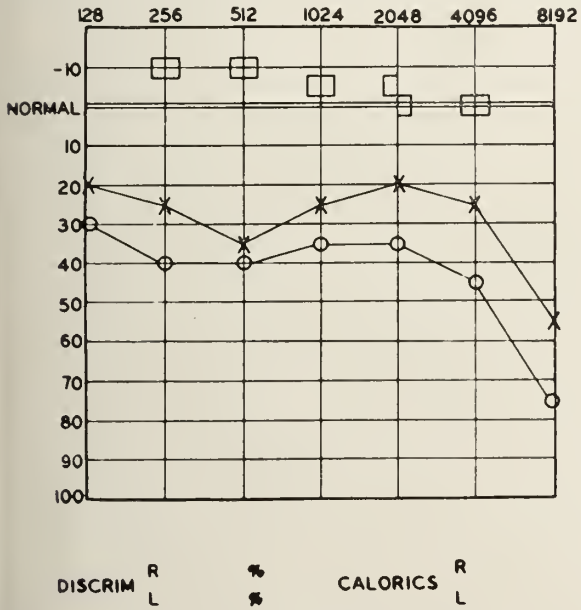


Fig. 11. Case 9. Bilateral conductive deafness.

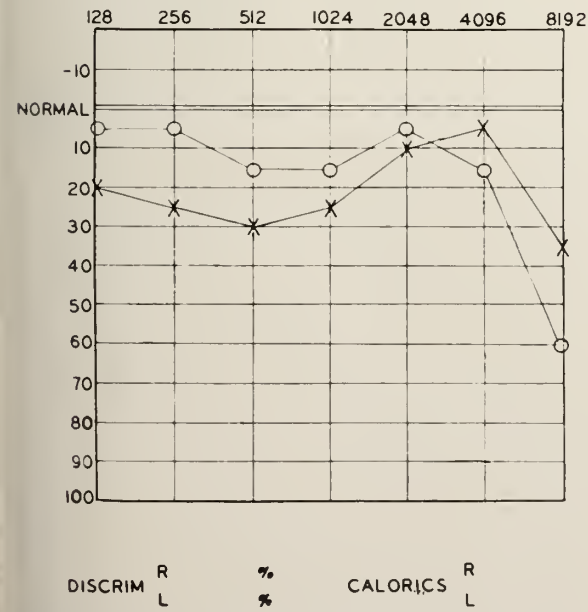


Fig. 12. Case 9. Bilateral conductive deafness showing improvement after adenoidectomy.

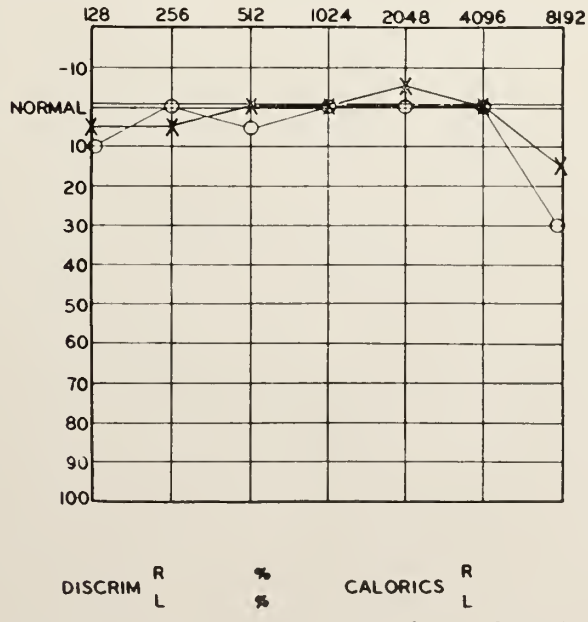


Fig. 13. Case 9. Normal hearing after antihistaminic therapy.

Trichomonas Vaginitis and Trichomoniasis

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THE PROBLEM OF VAGINITIS is one of paramount importance in the office of every physician who treats women. Of the vaginal infections, *Trichomonas vaginitis* is one of the most frequent forms encountered and constitutes the most common etiologic factor in the production of leukorrhea. Although only mildly virulent, it can be a supreme pest, being one of the most annoying problems in gynecologic practice to both the physician and the patient.

A description of leukorrhea is contained in the hippocratic corpus, a collection of writings codified for the Library of Alexandria in the third century B.C. The use of astringent vaginal capsules was apparently common therapeutic practices in that age. The flagellate protozoon, *Trichomonas vaginalis*, was first discovered in 1836 by Donn .¹ Little attention was given for eighty years to *Trichomonas vaginalis* as being an etiologic agent in vaginitis. It was not until 1916 that Hochne² associated a specific type of vaginitis with the organisms. In 1940, Trussell and Plass³ demonstrated the pathogenicity after infecting 9 of 29 women who had been inoculated with pure cultures.

Trichomonas vaginalis vaginitis is caused by a flagellate protozoon, *Trichomonas vaginalis*.¹ Differentiation of species of human trichomonads has been controversial. At present, most investigators consider *Trichomonas buccalis* (of mouth), *Trichomonas vaginalis*, and *Trichomonas hominis* to be of separate species. *Trichomonas vaginitis* is found in all age groups and frequently occurs during pregnancy. The incidence of *Trichomonas vaginitis* has increased and appears to become more common as indigency occurs. It is more common among gynecologic patients than in healthy women; it is also more common in the Negro race. Promiscuous sexual

habits and poor genital hygiene play an important role. The incidence is very high in women with venereal disease and among prostitutes. It can occur in virgins and celibate women. More and more gynecologists are coming to believe that trichomoniasis is a venereal disease. Bauer⁴ writes that urogenital trichomoniasis is now the most common transmissible venereal disease and, therefore, demands official recognition as such. Sylvestre and associates⁵ found that *Trichomonas vaginitis* caused 11 per cent of male and 33 per cent of female cases of nongonococcal urethritis and vaginitis during 1957 at a urologic clinic in Montreal and believe that the same measures used to combat other venereal diseases should be applied to *Trichomonas vaginitis* infections.

Frequently, leukorrhea is the only symptom presented by the patient, and it may be so pronounced as to necessitate wearing a pad. *Trichomonas vaginitis* should be suspected whenever a woman complains of a vaginal discharge accompanied by itching. Profuse discharge is associated with a burning and an annoying itching sensation in the vagina, vulva, and perianal region. At times it is so severe that sleep is disturbed, especially when the vaginal mucosa is denuded. There may be a burning sensation when voiding urine, particularly if the urethra and trigone of the bladder are involved. Perineal soreness, vulvar burning, polyuria, dysuria, and low back pain may also be complaints. Dyspareunia and vaginismus due to the local disease may interfere with marital relations.⁶ Although the discharge has no typical odor, it is often of a disagreeable penetrating nature and annoying to the patient. The type of leukorrheal discharge is quite variable. It may be thin and watery, creamy-white, or a greenish-yellow foamy pus. This frothy discharge of offensive odor may be due to saprophytes and other associated organisms, such as the *Micrococcus aerogenes* *alcaligenes* which cause gas bubble formation.

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The introitus and entire vaginal wall are usually reddened all the way up to the vault. The mucous membrane is often rough with punctate mottling from numerous petechial spots which extend also onto the portio of the cervix and have a "strawberry" granular appearance. The external cervical os is usually red and occasionally bleeds readily even though there is no erosion. The external genitalia may be extremely tender due to an associated severe vulvitis and intertrigo. Symptoms may become more florid during pregnancy; but, in some cases, the trichomonal discharge disappears spontaneously immediately after labor only to recur a few weeks later in a severe form. Exacerbation of symptoms often occurs postmenstrually. Some women have no symptoms despite the fact that the vagina contains numerous *Trichomonas vaginalis*. It is estimated that 20 to 25 per cent of cases may be entirely asymptomatic.

The diagnosis is made by both microscopic and clinical findings. For proper examination, it is desirable to instruct the patient to avoid even a cleansing douche for several days prior to being examined. A fresh drop of vaginal secretion adhering to the gloved finger after a digital examination is placed on a coverslip or warmed slide and examined immediately. No lubricating jelly should be used on the glove. The secretion can also be obtained from the posterior fornix with a stiff wire loop and mixed with a drop of warm normal saline on a slide. It is best to use a coverslip (hanging drop) and high power lens. *Trichomonas vaginalis* can live in urine specimens for several hours and be obtained for diagnosis from a slowly centrifuged urinary sediment. The *Trichomonas vaginalis* vary considerably in size, usually being larger than a polymorphonuclear cell but smaller than an epithelial cell. It is usually spindle-shaped or pyriform. The front end is rounded and from it protrude four flagella which arise from a common stem. It has an undulating membrane and is motile, having a peculiar jerky motion. It is difficult to detect in stained preparations.

TREATMENT

New medical agents for the local treatment of the disease are advertised almost daily. The lack of a truly effective agent is testified by the hundreds of preparations presently on the market which easily kill the *Trichomonas vaginalis* in vitro; but, in vivo, the recurrence rate is very high. Despite multiplicity of agents advocated, an ideal drug or combination has yet to be evolved. The best results are from combined treatment by doctor and patient. No matter how

effective the trichomonacides, the normality of the vaginal epithelium must be restored. The vulva and vagina may be cleansed with green soap and tap water. The vagina, vulva, and area around the anus are dried. The vulvar hair, if thick or matted, should be kept closely clipped. Tinctures should not be used, as they may be injurious to the vaginal mucosa. Some antiseptics tend to coagulate albuminous material, which, along with the presence of mucus or pus, may affect the action of certain drugs upon flagella which are not on the surface of the vaginal mucosa. Some aqueous solution of antiseptics, such as Zephiran chloride, appear to be effective in cleansing the vaginal mucosa. A speculum is inserted, and the powder used is spread with a blower over the entire vaginal surface, the vault of the vagina, cervix, and, later, over the entire vulvar and anal area. The speculum is turned as the powder is insufflated. Some of the effective powder preparations commonly used are Tricofuron, Floraquin, Devegan, and Stovarsol. The patient should not have douched for a day prior to office treatment. Each of us has his own choice method of treatment. In unresponsive cases, we should suspect that the treatment is being improperly applied or that there is another cause for the vaginitis. Frequently, changing from one form of therapy to another is distinctly better than persisting with one drug because, apparently, the *Trichomonas* may develop a resistance to certain trichomonacides after awhile. In severe, stubborn cases, it is sometimes of value to treat the patient in the knee-chest position, especially if the vagina is deep and redundant. In this posture, air pressure flattens the vaginal folds and obliterates the rugae, making application of therapy more effective. The patient is treated in the office a couple of times the first week and once a week thereafter for several weeks. Therapy is particularly effective during and immediately after cessation of menses. The number of office treatments varies, depending on the individual response to therapy and severity of the infection. No definite standard can be set. The patient should be observed for several months after cessation of office treatment. Between office treatments, the patient treats herself by introducing, preferably with an applicator, drying suppositories, such as Floraquin, Devegan, Tricofuron, and other flagellacides which are now available. Wiquist and associates⁷ found Trichomycin to be of therapeutic value. The patient is instructed to push the suppository, preferably with an inserter, high into the vaginal vault at night after she goes to bed; else the suppository may drop down so far that

it will not do much good. She should wash her hands before treating herself. Most of these preparations not only exert a specific destructive action upon the *Trichomonas* but change the bacterial flora of the vagina by producing a lower pH for the normally existing lactic acid bacillus, thus restoring a normal condition with proper glycogen content. It must be remembered that at times some patients may be sensitive to certain flagellacides, causing an associated local chemicoallergic reaction. Detergent douches, especially those that change the pH of the vaginal secretions to the acid side, are usually prescribed sparingly before insertion of a suppository. It is well to keep the vagina as dry as possible. A white vinegar acid douche is commonly used. Carlendacide (Vagisecc liquid) solution is preferred by Davis⁸ and is also popular with others.⁶ Lassar's paste, calamine lotion, and similar preparations may be used externally. If necessary, the patient's mode of living and "feminine hygiene" should be corrected. She should be taught the correct direction in which to wipe the perineum. The urethral orifice in some women is located just above the vaginal orifice, readily permitting urine to enter the vagina. These patients should be instructed how to separate the small labia during urination. Hodgson⁹ believes that tight clothing worn over the perineum, such as tight panty girdles, pajamas, vulvar pads, and wet bathing suits, greatly predisposes to vaginitis. She also advises against douching and showers and instead recommends a tub bath for ten to fifteen minutes each day with a small amount of Dreft, Vel, or similar detergent added to the water. Coitus should be restricted as well as alcoholic beverages. A well-balanced diet is prescribed. Many believe that vitamin B and C plus trace elements aid in healing the vaginal epithelium. Small doses of diethylstilbestrol (0.1 mg. daily) tend to restore a normal type of vaginal mucous membrane. Tritheon and other oral preparations have been advocated; but the results, judging from various reports, have not been too encouraging. Peroral Furadantin has been used by some in the treatment of urethrotrigonitis. No medicated powder or liquid should be blown into the vagina during pregnancy. Several deaths have occurred in pregnant women from air embolism. Pregnant women may use a medicated vaginal jelly or cream. Moore and Simpson¹⁰ believe that *Trichomonas* vaginitis is a psychosomatic symptom which occurs as a result of a change in the vaginal physiology that is produced by emotional stress. Recurrence is prone to occur in high-strung women, many of whom are frigid.

The male partner must always be suspected of harboring the flagellate and be examined with this in mind. Cycles of reinfection are often due to the male factor. Any man who has a urethral discharge and, particularly, a morning discharge, should be suspected of having trichomoniasis, especially if his wife has a definite history of disease, such as an undiagnosed or untreated discharge from the vagina. The urethral discharge as well as the urine is studied for trichomonads, and, if such are found, the patient is treated with prostate massage and urethral instillations of 0.6 per cent Furacin. This usually controls the condition, but Garske¹¹ finds that maintenance of an acid urine with a mild urinary acidifying agent and antiseptic, such as Mandelamine, has been helpful. The source of infection must be controlled as well. It is now recognized that uncircumcised men may harbor trichomonads under the prepuce. A circumcision is recommended, particularly if there is a considerable degree of phimosis. If the patient does not have a phimosis, twice daily cleansing of the prepuce and glans penis with ordinary toilet soap or one of the mild detergents is recommended. Stricture is also an etiologic factor in persistence of these infections. Male trichomoniasis may be asymptomatic or may be similar to that in women with a symptomatic urethritis. Ortho *Trichomonas* Diluent will clearly demonstrate the organism microscopically both from the urethral secretions and centrifuged urinary sediment. The treatment of trichomoniasis in men and women is a combined problem. The urologist should clear up the man's difficulty and the gynecologist, the woman's.

An attempt should be made to eradicate all foci and sources of reinfection. No doubt there are many apparent clinical cures, but the incidence of absolute cures is much smaller. Prevention demands the removal of all foci, such as ectropion of the cervix, chronic endocervicitis, skeneitis, bartholinitis, urethrocystitis, and contaminated towels, douche nozzles, and the like. Bloody discharge (menstrual flow), bacterial infection, and changes in vaginal secretions predispose to infection. Close proximity of the rectum and anus to the vagina permits the organism to transfer from one location to the other via moisture of the perianal skin or by stroking the toilet tissue in an anterior position. A woman occasionally contaminates another by the common use of toilet articles. Infection may have resulted from a tub previously used by an infected woman. Possibly, infection may come from a contaminated undersized toilet seat. In rare instances, a bed pan or an enema tube may harbor

Trichomonas. Women who are more prone to recurrence are those working either with the public in general or in offices with large groups of women. It has been suspected that algac-laden, warm inland lakes may harbor trichomonads for a short time, since patients frequently report first evidence of infection while on a vacation or shortly thereafter. Diseased cervixes should be cauterized and cervical polyps removed. Infected Skene's ducts and Bartholin's glands should in a like manner be properly eradicated. Urethrocystitis originates commonly from the cervicovaginal foci and is discovered from the cystoscopic picture. Flagellates are easily detected when present, and a definite diagnosis can be made only after the organism is seen. Cystoscopy often reveals cystitis with the so-called "strawberry" trigone and granular urethritis. Occasionally, urethral cysts and polyps are noted. The presence of a urethral caruncle is not uncommon or is stenosis of the external urethral meatus. Removal of all urethral pathology is essential to control the cystitis. Urethral dilation and instillation are required to treat the heavy granulation tissue of the involved urethra. Garske¹² treats the bladder involvement with irrigations of achroflavin, silver nitrate, urolocide, or Achromycin.

SUMMARY

1. *Trichomonas vaginalis* is a common, stubborn protozoan invader causing many disagreeable symptoms that frequently bring the patient to the doctor's office.

2. More and more gynecologists are coming to believe that trichomoniasis is a venereal-like

disease, since its incidence increases with indigency and promiscuity.

3. Adequate treatment is essential. There are many more apparent clinical cures than absolute cures.

4. All foci of reinfection must be eradicated as recurrences are common.

5. The treatment of trichomoniasis is a combined, twofold problem. The urologist should clear up the man's problems and the gynecologist, the woman's. The role of the man as carrier and as cause of recurrence in the woman must be acknowledged and treated if treatment of the woman is to be effectual.

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ACUTE GRANULOCYTIC LEUKEMIA in pregnancy may be treated more effectively with antimetabolites than with steroids, although therapy should be deferred until after the first trimester when teratogenesis is not a factor. Corticosteroid therapy is reported to have accelerated the course of acute myeloblastic leukemia in 1 of 4 patients. Because of the limited life expectancy of the leukemic patient, fetal salvage is low regardless of treatment. Although trans-placental transmission of leukemia is not evident, offspring should be observed indefinitely.

A Procedure to Prevent Postpartum Cervical Erosion

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EVERY LABOR is attended by some injury to the cervix. The injury may be a minute nick in the mucosa or a deep rent extending throughout the cervix. Erosions and hypertrophy are frequent and are associated in many instances with endocervicitis.

The treatment of these postpartum conditions must be immediate and adequate to reduce the more serious consequences that might result from neglect. A vaginal cream containing allantoin, sulfanilamide, and 9-aminoacridine in a water miscible base has been used with good to excellent results. Since the cream had to be inserted by means of an applicator, some patients raised objections to its use. As a result, the same formula of allantoin 2 per cent, sulfanilamide 15 per cent, and 9-aminoacridine 0.2 per cent in a glycerinated-gelatin suppository was made available for therapeutic evaluation.

MATERIALS AND PROCEDURE

The study was divided into 2 phases: In the first phase, a series of 135 consecutive, unselected deliveries were treated. Patients requiring cesarean section were not included for obvious reasons. The age of the patients ranged from 17 to 38 years. There were 49 primigravidas and 86 multigravidas.

In this series, the treatment was uniform. The patients were hospitalized for five days, during which time the nurse inserted a suppository high up into the vagina in the morning and evening. Each patient was instructed to remain on her back for at least one hour following each insertion of the suppository.

The second phase of the study involved 50 patients, 25 of whom were treated with allantoin-sulfanilamide-9-aminoacridine suppositories and 25 were untreated.

Bacteriologic studies were made in both groups of this series. The treated group was made up of 11 primigravidas and 14 multigravidas. The

control group consisted of 12 primigravidas and 13 multigravidas.

RESULTS AND COMMENTS

The allantoin-sulfanilamide-9-aminoacridine suppositories modified the vaginal debris so that freer drainage was established. A soothing effect was manifested in almost all of the patients.

The condition of the cervix six weeks after delivery in the first series of 135 patients is noted in table 1. At this time, it was found that the cervix was clean in 81 patients. There was no evidence of any lesion. In 33 patients, there was slight erosion requiring no further therapy, and, in 21 patients, erosion therapy was necessary.

The 21 patients requiring erosion therapy were cauterized and then treated with allantoin-sulfanilamide-9-aminoacridine suppositories. One suppository was inserted high in the vagina on arising and at bedtime for ten days.

The 4 primigravida patients were cured by one course of treatment.

Of the 17 multigravidas, 15 were cured by one course of treatment, and 2 required a second course to effect a cure.

In the second series of 50 patients divided into 2 groups of 25 each, the condition of the cervix is noted in tables 2 and 3.

The 3 patients in the treated group requiring erosion therapy were cauterized and treated with allantoin-sulfanilamide-9-aminoacridine suppositories twice daily for ten days before an ultimate cure was effected.

Treatment of the erosions consisted of cauterization and allantoin-sulfanilamide-9-aminoacridine suppositories twice daily for ten days.

Of the 3 primiparas in the control group requiring erosion therapy, 2 were cured by one course of treatment and the third needed a second course.

The 2 multigravida patients requiring erosion therapy were cured by one course of therapy.

The bacteriologic studies in both groups were made immediately after delivery and on the fifth postpartum day. Three culture media were used: blood agar plates, Nickerson's medium for fungi,

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and an enriched broth in an attempt to culture *Trichomonas vaginalis*. The bacteria identified in the cultures studied are listed in tables 4 and 5.

TABLE 1
FIVE DAYS' TREATMENT WITH ALLANTOIN-SULFANILAMIDE-9-AMINOACRIDINE SUPPOSITORIES

Condition of Cervix 6 Weeks Post-partum

Gravida	Clean	Slight erosion	Erosion therapy	Total
Primi	27	18	4	49
Multi	54	15	17	86
Totals	81	33	21	135

TABLE 2
TREATED GROUP
ALLANTOIN-SULFANILAMIDE-9-AMINOACRIDINE SUPPOSITORIES TWICE DAILY FOR 5 DAYS

Condition of Cervix 6 Weeks Post-partum

Gravida	Clean	Slight erosion	Erosion therapy	Failed to return	Total
Primi	6	3	1	1	11
Multi	7	1	2	4	14
Totals	13	4	3	5	25

TABLE 3
CONTROL GROUP
NO TREATMENT OTHER THAN POSTPARTUM HYGIENE FOR 5 DAYS

Condition of Cervix 6 Weeks Post-partum

Gravida	Clean	Slight erosion	Erosion therapy	Failed to return	Total
Primi	4	5	3	0	12
Multi	4	5	2	2	13
Totals	8	10	5	2	25

TABLE 4
GROUP TREATED WITH ALLANTOIN-SULFANILAMIDE-9-AMINOACRIDINE SUPPOSITORIES

First day	Bacteria identified	Fifth day
3	<i>Staphylococcus aureus</i>	2
14	<i>Staphylococcus albus</i>	12
5	<i>Staphylococcus citreus</i>	3
9	<i>Streptococcus</i> (nonhemolytic)	5
4	<i>Bacterium coli</i>	5
2	<i>Bacterium proteus</i>	3
7	<i>Monilia albicans</i>	3
0	<i>Trichomonas vaginalis</i>	0

TABLE 5
CONTROL GROUP

First day	Bacteria identified	Fifth day
2	<i>Staphylococcus aureus</i>	2
14	<i>Staphylococcus albus</i>	17
5	<i>Staphylococcus citreus</i>	5
6	<i>Streptococcus</i> (nonhemolytic)	8
4	<i>Bacterium coli</i>	9
2	<i>Bacterium proteus</i>	4
2	<i>Monilia albicans</i>	2
0	<i>Trichomonas vaginalis</i>	0

The bacteriologic studies on the fifth postpartum day showed a reduction in the number of bacteria on the agar plates and a significant control of bacterial growth. There was a significant reduction in staphylococci and nonhemolytic streptococci as well as in monilia infestations.

In the control group, the incidence of mixed infections increased, particularly in the cases of *Staphylococcus albus* and *Streptococcus* (nonhemolytic). The incidence of *Bacterium coli* showed an increase of slightly better than double on the fifth day compared to the first day.

DISCUSSION

The therapeutic effectiveness of allantoin-sulfanilamide-9-aminoacridine cream is attested to by the growing number of reports in the medical literature.¹⁻⁶ The crux of any treatment of cervical and vaginal disorders is to stimulate healing of raw and ulcerated areas and to re-establish normal vaginal flora.

Allantoin was thought to be one of the main causes for the growth-stimulating effect observed in the course of maggot therapy. It remained for Shipp and Hetherington⁷ to demonstrate that allantoin alone actively stimulated tissue growth and also served to liquefy necrotic proteins.

Allantoin, according to Tremble,⁸ appears to act in 3 ways:

1. It has a digestive-like action on pus and necrotic tissue.

2. In cases in which healing is slow, it stimulates proliferation and tends to produce healthy, pink granulating tissue.

3. It has a synergistic action with sulfa drugs. In its presence, bacteria which have become sulfa-fast are resensitized to the action of sulfonamides.

Tremble found that allantoin exerted a soothing effect. Clinically, it was found to break up pus, allowing it to drain away more freely.

The above observations were to a large degree confirmed by Saralegin and Villaneuva.⁹ They

concluded that allantoin-sulfonamide mixtures: (1) stimulate phagocytosis, (2) accelerate the elimination of substances which inhibit healing, (3) prevent the harmful effects of sulfanilamide, and (4) stimulate cell proliferation and formation of new tissue.

To assure effectiveness of allantoin-sulfanilamide vaginal cream against a broader bacterial spectrum, as well as monilial vaginitis, it was decided to incorporate 9-aminoacridine into the formula. Martin and Moss¹⁰ found that 9-aminoacridine and sulfanilamide used together resulted in a synergism. The former was found to inhibit the formation of para-aminobenzoic acid and to enhance the bacteriostatic effect of sulfanilamide.

When several modalities of treatment are available utilizing the same therapeutic agent and positive clinical results are obtained, the treatment requiring the least effort on the part of the patient should be the one of choice. The allantoin-sulfanilamide-9-aminoacridine suppositories are easier to insert than an applicator, and the physician is assured of greater patient cooperation. The product is stable even in warm weather. There were no cases of allergy noted in the series studied.

CONCLUSIONS

The postpartum use of allantoin-sulfanilamide-9-aminoacridine suppositories reduced the inci-

dence of postpartum cervical erosions about 60 per cent. Evidence indicates that endocervicitis can be successfully treated with these suppositories.

The use of allantoin-sulfanilamide-9-aminoacridine suppositories as a treatment of postpartum cervical erosion and endocervicitis is effective, nonirritating, and easy to use and begets patient acceptance.

AVC Improved suppositories, containing allantoin, sulfanilamide, and 9-aminoacridine, were supplied for this study by The National Drug Company, Philadelphia.

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PREGNANCY OCCURRING after ligation of the inferior vena cava and ovarian veins is not affected.

A total of 47 pregnancies in 23 women occurred after inferior vena cava and ovarian vein ligation. Of these, 30 proceeded to term or ended prematurely and 17 ended in abortion. All but 1 of the women conceived within four years after operation. Antenatal care was identical to that given nonligated women. No increased incidence of leg vein or vulvar varicosities or other venous abnormalities was noted. The conduct of labor, delivery, and puerperium was no different than in nonligated women.

Of the 17 abortions, 13 occurred in first postligation pregnancies and were considered related to the effects of the infectious process prompting the life-saving ligation rather than interrupted venous return. Of the 13 women who aborted, 8 subsequently had successful pregnancies.

JASON H. COLLINS, M.D., JULIUS A. S. BOSCO, M.D., and CARMEL J. COHEN, M.D., Tulane University and Charity Hospital of Louisiana, New Orleans. *Am. J. Obst. & Gynec.* 77:760, 1959.



This department of THE JOURNAL-LANCET is devoted to reports on cases in which all the appropriate diagnostic criteria have been employed, the best known treatment administered and the results recorded. It is desired that these case reports be so prepared that they may be read with profit by physicians in general practice, hospital residents and interns and may be of considerable value to junior and senior students of medicine. This department welcomes such reports from individuals or groups of physicians who have suitable cases which they desire to present.

Rupture of the Cardiac Septum and Myocardium Following Myocardial Infarction

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PERFORATION of the interventricular septum as well as rupture of the myocardium with hemorrhage into the pericardium is not an unusual complication of myocardial infarction. The diagnosis of this condition may be made before death. When perforation occurs through the septum, the patient evidences acute cardiac decompensation. In conjunction with the heart failure, a loud blowing systolic murmur may be heard over the precordial area. If a patient who has a myocardial infarction suddenly enters acute heart failure and, at the same time, a harsh, blowing systolic murmur occurs over the precordium, the diagnosis of perforation of the septum is tenable. Should there be an associated rupture of the myocardium with hemorrhage into the pericardial sac, cardiac tamponade occurs.

With our present advances in the surgical treatment of heart disease, it seems likely that such complications could be relieved by surgical closure of the perforations both in the septum and in the ventricular wall.

CASE REPORT

This is a report of a 63-year-old white woman who, while visiting with her husband in the hospital, suffered a very severe crushing pain in her chest, with the pain radiating down both arms. The electrocardiogram revealed a posterior myocardial infarction, and the patient's course was typical of an individual with a myocardial infarction.

On July 18, 1956, at 5:00 P.M., the patient suddenly became dyspneic. Pulmonary edema appeared, and for the first time, a loud, harsh blowing systolic murmur was heard over the precordium. The diagnosis of per-

foration of the interventricular septum was made, and, with the apparent increase in venous pressure, it was felt that perhaps there had been a tear through the ventricular wall. The patient died about six minutes after the appearance of the acute episode. The report of the autopsy examination is limited to the heart. The coronary arteries showed arteriosclerosis. The right coronary artery was occluded by a thrombus approximately 3 cm. below its origin. The thrombus completely closed the lumen of the artery. Hemorrhage occurred in the fat in this area as well as in the myocardium of the left ventricle. The posterior portion of the left ventricular wall as well as the posterior area of the septum and the posterior part of the right ventricle was soft and yellow. A rent through the posterior wall of the septum communicated directly with a longitudinal rent through the myocardium.

The pericardial sac was distended with both liquid and clotted blood. The pathologic diagnosis was coronary thrombosis and myocardial infarction, with a rupture of the interventricular septum and the ventricular wall with resulting hemopericardium.

Many of these patients survive a number of days and some live for many months following perforation of the septum alone. These people certainly could be candidates for surgical correction of this defect. It is suggested that in these cases a trained surgical team could close the rent in the septum and the ventricular wall and cure the patient.

SUMMARY

A case is reported wherein a patient sustained a myocardial infarction which was complicated by perforation of the septum and rupture of the ventricular wall, resulting in hemopericardium. The classical signs and symptoms were present, and it is suggested that these patients may well be candidates for the surgical closure of the ruptured areas.

JOHN F. BRIGGS is associate professor of clinical medicine at the University of Minnesota. JAMES BELLOMO is a St. Paul internist.



Sidney A. Slater, M.D.

*Educator, Superior Clinician,
Contributor to Knowledge,
and Benefactor of Humanity*

J. ARTHUR MYERS, M.D.

WHEN SIDNEY SLATER was born at Enfield, Virginia, on August 26, 1884, no one could have predicted that one day he would be known around the world for his judicious and extensive use of the items discovered and used so near the time of his birth by Koch, Trudeau, and Röntgen.

Sidney was reared on a farm and was kept busy with chores. The last summer before starting college he clerked in a country store where the hours were long and irregular and the salary was \$5.00 per month with maintenance. He slept in the store building and was often awakened to get something for a customer. The post office was in the store, and one patron who came for his mail only once a week—Sunday—arrived at daybreak.

Young Slater found the going pretty tough when he entered college. His precollege training had been rather limited. When he entered Richmond College, he was its "youngest and greenest" student, as he had never before been more than 25 miles from home. However, in due time, he entered the Medical College of Virginia at Richmond.

After receiving the degree of Doctor of Medicine in 1909, he served an internship in Richmond City Hospital after which he immediately entered general practice at McComas, West Virginia. In 1912, he became a victim of clinical tuberculosis, as happened to so many students and recent graduates of medicine in those years. He spent the greater part of 1912 "taking the cure" in a private sanatorium located near the Virginia State Sanatorium. When he was able, he spent part of his time helping with the work in the sanatorium and at the state sanatorium. When he had recovered sufficiently, he went to Grand View Sanatorium, Oil City, Pennsylvania,

as medical director and served in that capacity until 1919.

During his school years, Dr. Slater had seen tuberculosis at the height of its destructiveness in the United States when each year almost 200 people of every 100,000 were paying with their lives and probably 10 times that many were becoming clinical cases because the materials and procedures produced by Koch, Trudeau, and Röntgen had not been placed in general use. From the beginning, Dr. Slater had a vision of tuberculosis control which carried through to the ultimate eradication of the disease. He had entered college about the time the National Tuberculosis Association was organized when the most extensive and intensive campaign of all times for disseminating information concerning this disease was begun.

While directing the Grand View Sanatorium, he made keen observations on diagnosis, treatment, and prevention. He attended medical meetings regularly, participated in programs, became a member of the National Tuberculosis Association and the American Sanatorium Association (The American Trudeau Society since 1939). He became widely known as an expert in tuberculosis. Thus, the commission of the Southwestern Minnesota Sanatorium at Worthington invited him to become medical director. He assumed the duties of this new position in January 1919.

In addition to his fine experience as a sanatorium medical director, the two years he had in general private practice stood him in good stead. In the 8 counties he was to serve, all of the physicians were in general practice. He understood their work and their problems as well as their superior importance in the

control of tuberculosis. They were the persons who, for the most part, were to make the diagnoses throughout the area and arrange for treatment. There he had an opportunity to avoid the injustice and neglect which the general practitioners of medicine had been allowed to suffer in the tuberculosis control program in so many parts of this country. There had been failure to take cognizance of Dr. Trudeau's statement: "For on the general practitioner and the dispensary physician rests a great responsibility of detecting the disease in its incipency. It is to them and not to the specialist that the patient first applies."

Recognizing the importance of general practitioners, Dr. Slater acted accordingly. Soon after admission to his sanatorium, patients heard their family physicians praised. During their stay in the institution, the medical director kept in close touch with the family doctors by correspondence or telephone. He invited them to visit their patients frequently.

When patients were ready for discharge, they returned to their general practitioners and were advised to keep themselves under close observation with frequent periodic examinations. In advance of discharge, Dr. Slater informed physicians that their patients were returning home and that full responsibility for postsanatorium care would rest upon them. Thus, the patients returned with every confidence in the ability of the physicians who had diagnosed their disease. Therefore, in this sizable geographic area, the office of every physician was and is a tuberculosis center in which the latest information on diagnosis, treatment, and prevention are known and practiced. In the counties of this sanatorium district, mortality, morbidity, and infection attack rates tumbled.

Dr. Slater's early years at the Minnesota institution were in the era when it was unusual for a tuberculous person to enter a sanatorium if his disease was not advanced and contagious. Some were within days or weeks of death on admission. In fact, in 1919, when his work began in Worthington, 2,244 people in Minnesota died from tuberculosis, a mortality rate of 95.3 per 100,000 population. In the 8 counties which then constituted his sanatorium district, there were 67 deaths in 1919. His institution had a 54-bed capacity. It was filled, and a long list of sick people were at home awaiting admission.

As he spent the major part of his time caring for the sick, it was obvious to him that tuberculosis would never be eradicated anywhere as long as people with contagious disease were allowed to remain at homes and communities to disseminate tubercle bacilli among their associates. Dr. Slater also realized that a true program of eradication must start with children inasmuch as they are born uninfected with tubercle bacilli. Thus, he reasoned that a successful program would necessitate creating an environment free from these organisms in hospitals and homes where children were born and thereafter

maintaining such an environment. The chain of infection had to be broken. As rapidly as possible, he removed the contagious adult cases, including fathers, mothers, and grandparents, from their homes and isolated them in the sanatorium.

He knew also that the bovine type of tubercle bacillus is as dangerous and destructive in human tissues as in those of cattle. Therefore, he gave the fullest support to veterinarians in their campaign to eradicate tuberculosis from the herds.

ACCOMPLISHMENTS IN SCHOOLS

In another revolutionary move, he entered schools throughout his sanatorium district and administered the tuberculin test to children and personnel. Here he found that there were teachers and others on the school payroll who had contagious tuberculosis. Prior to 1924, it was contended that, in most places, 90 to 95 per cent of school children had been infected with tubercle bacilli. Then, appearing before the annual meeting of the National Tuberculosis Association in Atlanta, Georgia, in 1924, Dr. Slater startled tuberculosis workers throughout the world by his report that the testing of 1,654 rural school children revealed that only about 10 per cent were harboring tubercle bacilli but that 80 per cent of the children from homes in which contagious cases of tuberculosis had been allowed to reside were infected with these organisms and, therefore, reacted to the tuberculin test. Armed with his findings, he continued to stress the necessity of "breaking the chain of infection," and through public addresses, radio, television, and articles in medical journals and other publications, he emphasized the importance of pre-employment and periodic examinations for school personnel everywhere.

Sidney Slater's interest and accomplishments in tuberculosis control in schools were so recognized that he was appointed a member of the Minnesota subcommittee of the Committee on Tuberculosis of the American School Health Association in the early 1940's. This committee drafted standards by which schools might be officially certified on the basis of tuberculosis control work in progress. Using these qualifications, which have since been adopted in several states, he saw the first school in the world certified and later participated in issuing more than 3,200 such certificates in Minnesota while thousands were awarded in other states.

One of Dr. Slater's first acts on arriving in Minnesota in January of 1919 was to join the Minnesota Tuberculosis and Health Association and the State Sanatorium Association. His value was promptly recognized. He served on every important committee and was president of the Tuberculosis Association for six years from 1938 through 1943. Beginning in 1930, this association annually recommended him as its representative on the Board of Directors of the National Tuberculosis Association, in which capacity he worked for twenty-nine years—far longer than any other Minnesota physician had

served on that board. He served on the most important committees of the National Tuberculosis Association and was vice president in 1947. He also held important posts in the American Trudeau Society and is a past president of the Mississippi Valley Trudeau Society and the Minnesota Trudeau Society.

He was in great demand as a committeeman because he always manifested the courage of his convictions. His long years of experience, for which there is no substitute, provided him with superior knowledge. Therefore, he condemned anachronisms and supported to the nth degree well-established diagnostic, therapeutic, and preventive methods.

Since 1906, there had been an excellent state tuberculosis association with county component societies. These were lay organizations and the physicians in tuberculosis work were of the opinion that they should remain so. However, it seemed desirable to have an independent organization of physicians, both institutional and private, limiting their work mainly to tuberculosis and their presentations, discussions, and so forth to clinical tuberculosis. Dr. Slater was one of the founders of this organization in 1925, which was named the Minnesota Medical Society.

Dr. Slater was a strong supporter of organized medicine. He served as president of the Southwestern Minnesota Medical Association, Southern Minnesota Medical Association, and Sioux Valley Medical Association and was vice president of the Minnesota State Medical Association, of which he was a member of the house of delegates for ten years.

Since 1940, he became a member of the Committee on Tuberculosis of the Minnesota State Medical Association. This is a working committee with frequent meetings, and, although Dr. Slater lived 250 miles from the meeting place, he was rarely absent. Always an active participant, making sound recommendations and supporting worthwhile projects to be undertaken as a part of the medical association's statewide tuberculosis control program, he worked diligently for the adoption of a plan to accredit counties officially by the State Medical Association, the State Board of Health, the State Tuberculosis and Health Association, and the governor. He, more than anyone else, was responsible for preparing the qualifications which were adopted for official accreditation of counties on the basis of accomplishments in tuberculosis control. On December 11, 1941, he gave one of the main addresses on the occasion of granting the first county accreditation certificate at Tyler in Lincoln County. Throughout the succeeding years, his persistent promotion of this project was so successful that by June 1959, 69 of Minnesota's 87 counties were accredited.

Dr. Slater was a founder of the Minnesota chapter of the American College of Chest Physicians and served as governor of the college for Minnesota for three years. He was a valuable participator in arranging programs on diseases of the chest presented

at the time of the meetings of the State Medical Association. He was enthusiastic over the college project, which was designed to have a committee on tuberculosis in every state, district, and county medical association in America. Indeed, he helped accomplish this goal in his state.

He had special interest in world-wide medical problems. In 1931, he and a number of other physicians visited the British Isles and other European countries. This was a guided tour, so that their time was divided between sightseeing and making medical observations. During the last three days in the British Isles, Dr. Slater and two other physicians visited places of great medical interest to them that had not been included in the tour. They spent one day at Oxford where their guide, on learning that two of them were from Minnesota, took special pride in showing them where Drs. William and Charles Mayo stood to receive their honorary degrees from that University. The remaining two days were spent in London visiting the museum of the Royal College of Surgeons. Dr. Slater considered this the most important and valuable part of the trip. He pointed out that during World War II the museum was destroyed and much that it contained can never be replaced.

He was an unflagging worker. The clock or a given number of hours per day meant nothing to him. His goals were always tasks well done regardless of the hours of day or night spent in completing them; hence, his fine accomplishments. After his original sanatorium district was established, additions were made until he served 12 counties with a population of 230,000 people. The success of his efforts is so phenomenal that in 1956 only one person in the entire district died from tuberculosis, whereas 67 had died in just the original 8 counties in 1919. His work also resulted in a marked decrease in morbidity and infection attack rates.

He was the author of numerous articles published in local and national medical journals, the first of which appeared in the *Virginia State Medical Journal* in 1918 entitled "The Cooperation of the General Practitioner, Sanatorium and Patient in the Fight Against Tuberculosis." His last paper was published in *The Journal-Lancet* in April 1959 on "Thirty-Five Years of Experience With the Tuberculin Test."

The name Sidney A. Slater graced the membership roll of many an organization. There is practically no important local, state, or national medical public health or tuberculosis association or society that did not claim him as a member.

HONORS AND AWARDS

In 1945, the University of Richmond recognized Dr. Slater's dedicated work and conferred upon him the honorary degree of Doctor of Science. Also in that year, the local Epsilon chapter of Phi Beta Kappa called him to Richmond to award him honorary membership. In 1947, the Mississippi Valley

Conference on Tuberculosis (12 states) voted him the Dearholt Medal for being the most outstanding worker of the year in the entire area served by the Conference. In 1957, the Minnesota State Medical Association awarded him a beautiful certificate for his magnificent contributions in tuberculosis control. In June 1959, he was awarded a 50 year pin by the state medical association. At the reunion of his college class of 1907, only days before his death at Richmond, Virginia, he was presented a gold 52-year pin.

He was not without honor even in his own town. On January 22, 1957, at the fifth annual Boss's Night Banquet of the Junior Chamber of Commerce of Worthington, Dr. Slater was named the outstanding boss of 1956. One-hundred local Jaycees and their bosses and guests were in attendance. Dr. Slater was cited for the relationship with employees at the sanatorium and for his dedication and achievements in the treatment and prevention of tuberculosis. He was made a life member of the Worthington Chamber of Commerce in 1957. He was one of the founders of the Worthington Kiwanis Club and its third president. He had been president of the Worthington Playground Association and a director of his county Red Cross and Worthington Country Club.

On November 4, 1957, a testimonial dinner was held in honor of Dr. Slater and Dr. C. L. Sherman, who had been chairman of the Southwestern Minnesota Sanatorium Board since 1917, the longest time any Minnesota citizen has served on a sanatorium commission. This was a momentous occasion.

Through the decades, Dr. Slater was constantly reducing the backlog of infected citizens in his sanatorium district. By finding, isolating, and treating contagious persons, large segments of the populations of tubercle bacilli were destroyed and corralled. Thus, fewer and fewer children and adults became infected. He strongly supported the program of the veterinarians, and all the counties in this sanatorium district were officially accredited as modified tuberculosis free areas by 1934. Thus, the populations of bovine type tubercle bacilli had been so nearly annihilated that few, if any, people became infected with this type of organism.

Inasmuch as all clinical cases develop in tuberculin reactors, it was obvious that the smaller the backlog of infected citizens became, the fewer the clinical

cases that would appear. With such an efficient program as Dr. Slater had developed, this result was inevitable. The applicants for sanatorium care on the waiting list became fewer and fewer until all clinical cases who would accept were in the sanatorium. Then, vacant beds began to appear and their number slowly but surely increased until those lacking a long-range vision of tuberculosis eradication began to consider closing the institution and dispersing the staff when Dr. Slater attained retirement age. Thus, the institution was closed November 1, 1957, and the remaining patients were moved to Riverside Sanatorium, Granite Falls, Minnesota, where they and subsequent clinical cases will receive excellent treatment. However, good evidence indicates that from one-fourth to one-fifth of the total citizenry of the 12 counties are harboring tubercle bacilli, a considerable number of whom will have clinical and contagious cases before this backlog of infected people disappears. Moreover, those who become contagious are likely to infect others, thus maintaining and increasing the backlog. All of these things Dr. Slater envisioned when the major effort against tuberculosis was abandoned in 1957.

With retirement at the sanatorium, Dr. Slater established a private practice in Worthington where he and his wife, Mildred, were most highly respected citizens. Although he brought under control the clinical pulmonary tuberculosis of which he was first aware in 1912, its residuals continued to harass him. Extensive fibrosis resulted in pronounced deviation and kinking of the trachea and bronchiectasis. Approximately twenty-five years ago, tuberculosis developed in his left elbow to such an extent that he was compelled to wear a cast for the remainder of his life. Emphysema resulted in serious reduction of pulmonary function in the last few years and he died on June 12, 1959.

Since 1913, when he first became medical director of a sanatorium, his life was devoted wholeheartedly to the diagnosis, treatment, and prevention of tuberculosis. Few physicians have lived who have so completely comprehended tuberculosis in all of its aspects as did Dr. Slater. Few have diagnosed so accurately, treated so successfully, and prevented so effectively. When the final chapter is written on the eradication of tuberculosis, the name Sidney Alexander Slater will deserve a prominent place.

The Szondi Test in Diagnosis, Prognosis, and Treatment, by LIFOT SZONDI, M.D., ULRICH MOSER, Ph.D., and MARVIN W. WEBB, A.M., Ed.D., 1959. Philadelphia: J. B. Lippincott Co., 309 pages. \$12.00.

This is an important book about an increasingly significant projective test for clinical psychologists. Dr. Szondi has served in the Psychological Institute in Budapest where he undertook extensive studies on the psychologic aspects of family association. His diagnostic drive test (the Szondi) has as its chief aim the exploration of a depth psychologic profile of subjects.

The test is a projective one, based on the patient's reaction to a series of 48 photographs of psychotic persons. The scoring can be done mechanically, and the test can be quickly made. Its characteristics are such that not only does it indicate various aspects of emotional overloading but also indicates changes that occur in the patient's reactions from day to day. This becomes an extremely important aid in prognosis and in judging the effectiveness of therapy.

This volume gives a detailed, statistically analyzed presentation of szondian depth psychology. The fundamental theory is well developed, and there are chapters devoted to group applications of the test and also forensic psychology. The book is well documented and indexed.

CHAUNCEY D. LEAKE

The Cerebrospinal Fluid: Production, Circulation, and Absorption, edited by G. E. W. WOLSTENHOLME and CECILIA M. O'CONNOR for the Ciba Foundation, 1958. Boston: Little, Brown & Co., 335 pages. \$9.00.

This book is a valuable collection of excellent papers dealing with the most recent views of production, circulation, and absorption of the cerebrospinal fluid. The book begins with a study of the embryonic, structural, and functional development of the choroid plexus. An interesting anatomic study of the arachnoid granulations follows. A critical electron microscopic study of the fine structural elements of the choroid plexus reveals the complexity of this important organ.

The controversial topic of final meningeal and choroidal ramifications of the nerves is presented accompanied by experimental evidence suggesting that all such nerve ele-



ments are those accompanying the vascular field. A study of perivascular spaces in the brain reveals their role in the circulation of cerebrospinal fluid. Radioactive isotope studies in the formation and absorption of cerebrospinal fluid indicate that the choroid plexuses are the primary sites of formation of the ionic substances. Interesting aspects of the role of vitamin A in the production of cerebrospinal fluid are presented. The cerebrospinal fluid central nervous system barrier is discussed, and experimental evidence is presented by means of radioactive elements. Based upon a study of arachnoid pouches, a propelling mechanism upon the subarachnoid fluid is suggested along the major cerebral arteries. Aspects of hydrocephalus are discussed concerning the mechanisms of production.

JOHN LOGOTHETIS, M.D.

Practical Leads to Puzzling Diagnoses, by WALTER C. ALVAREZ, M.D., 1959. Philadelphia: J. B. Lippincott Co., 490 pages. \$9.00.

This book is concerned with illnesses which, for the most part, have not been correctly diagnosed and for years have been inadequately treated. The numerous treatments included "useless operations." The reason those illnesses were not recognized lies in the fact that in his diagnostic studies the doctor usually relies on laboratory tests and x-ray studies, which cannot demonstrate a neurosis or a more or less marked psychosis. The author contends that the most outstanding fact about these many patients with "puzzling diagnoses" is that they are primarily victims of poor heredity. He reached this conclusion on the basis of clinical studies of 574 relatives of psychotic and alcoholic patients and 99 relatives of epileptic patients. He does not ignore the importance of environment, but he feels strongly that heredity is "far more important than environment."

In this perennial discussion of the respective roles of *nature* and *nurture*, the ont and out environmentalists, and even those less enthusiastic, will be justified in raising questions in regard to the methodology and procedure of the study. But, the fact remains that the reported clinical observations justify, at least in most cases, Dr. Alvarez' position as a strong advocate of nature.

However, the contribution of this volume to the debate on "heredity and environment," although significant, is not the main feature. My feeling is that the various and pertinent medical and psychiatric subjects discussed in the 29 chapters, plus a concise but very telling summary, render this book eminently useful to the general practitioner and specialist in any branch of medicine. I shall mention for illustration only a few of the headings in the table of contents: problems of diagnosis; some hints on taking a history; classification of neuroses and psychoses; alcoholism in families; sexual difficulties in men and women; urologic troubles; nervous fever; pain in the face, thorax, abdomen, rectum, coccyx and head; and the art of handling nervous persons. The last chapter mentioned is particularly impressive. The term, *born psychotherapist*, which the author uses, fully applies to himself. Those of us who are not blessed with being so well born will learn from this lucid presentation how to handle patients in general and those who are "nervous" in particular.

S. KATZENELBOGEN, M.D.

Hemophilic Arthropathies, by HENRY H. JORDAN, M.D., 1958. Springfield, Illinois: Charles C Thomas, 250 pages. \$8.50.

The author of this book has critically analyzed the care of the hemophiliac patient in regard to deformities of the extremities in 56 patients treated at the Lenox Hill Hospital, New York City. These cases have been selected from a series of over 110 cases treated between the years 1946 and 1956. This broad background of experience makes the author well qualified to offer suggestions in the prevention of, and correction of, the distressing and disabling deformities that are the sequella to hemorrhage in the hemophiliac patients' joints.

The sections on roentgenology graphically illustrate in both word

(Continued on page 24A)

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BOOK REVIEWS

(Continued from page 376)

and reproduction the typical x-ray findings of irregular cartilage erosion, coarsened trabeculations and decalcification of the epiphyses, juxta-articular cysts, and side-to-side enlargement of the epiphyses. Plates of the reproduction of x-rays are particularly well done.

Physical methods of correction of the deformity are essential, since surgical intervention is contraindicated. The details of plaster technique and bracing principles as applied to this problem are covered in minute detail. Casts and braces must be applied with meticulous precision to protect tissues that withstand trauma poorly. The principle of atraumatic application of subliminal corrective forces acting continuously is utilized in the corrective casts. The moulded leather-steel brace is utilized for maintaining correction once it is obtained.

The section devoted to tabulation of statistics on the 56 cases reported and the section devoted to narrative case histories present many interesting observations. However, the observations are hard to ferret out since they are obscured by detail. They are lost to the casual reader and take unwarranted time for the student.

For the individual interested in

the hemophiliac patient, this book presents principles and methods of treatment of joint deformities that are worth reading and utilizing in the evaluation of one's own efforts in the therapy of this crippling disorder.

PAUL M. ARNESON, M.D.

•
Modern Chemotherapy of Tuberculosis, by ROGER S. MITCHELL, M.D., and J. CARROLL BELL, M.D., with foreword by WILLIAM B. TUCKER, M.D., 1958. New York: Medical Encyclopedia, Inc., 109 pages. \$4.00.

This concise volume is No. 11 in a series of monographs on antibiotics under the editorial direction of Henry Welch, Ph.D., and Felix Marti-Ibanez, M.D. The foreword by William B. Tucker, M.D., outlines with subtle understanding the philosophies, principles, and pitfalls in the treatment of tuberculosis in general and therapy with antibiotics and other chemicals in particular. This section can be strongly recommended to the reader.

The chemotherapy of tuberculosis has been under continuous investigation for more than a decade, and most publications on this subject are out of date early after printing. This volume, however, has compiled the

modern information on the subject and, I believe, will remain useful for many years to come.

One of the principles now recognized in the treatment of tuberculosis is the need for prolonged chemotherapy long after the more acute phases of the disease have passed, so this book will be of real value to the general practitioner and internist without special training who often must follow and treat patients with tuberculosis after the shortened hospital phase of therapy has been completed.

The authors have discussed, albeit briefly, the essentials of drug therapy with emphasis on pharmacology, modes of action, dosages and regimens, toxicity, and drug resistance. Unfortunately, the authors, because of brevity, were unable to discuss in detail the relation of chemotherapy to the over-all treatment of tuberculosis.

Keeping in mind the inherent narrowness of the topic, this book can be highly recommended to all physicians and allied students of tuberculosis and especially to physicians who are in any way responsible for the care of patients with tuberculosis. This book will serve admirably as a guide in the chemotherapy of tuberculosis. The bibliography will be especially useful.

SUMNER S. COHEN, M.D.

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News Briefs . . .

North Dakota

DR. LEONARD W. LARSON, pathologist with the Quain and Ramstad Clinic and chairman of the Board of Trustees of the American Medical Association, has returned to Bismarck after attending several meetings. In May, Dr. Larson was one of three delegates representing the United States Health Department at the general assembly of the World Health Organization in Geneva, Switzerland. Upon his return to the United States, Dr. Larson participated in a symposium on the quality of medical care, which was part of the program sponsored by the Group Health Association of America. At the meeting of the American Medical Association in Atlantic City, Dr. Larson was re-elected chairman of its Board of Trustees. He was the principal speaker at the Recognition Day Dinner for Dr. Gunnar Gundersen, the outgoing president of A.M.A. Dr. Larson was recently notified of his appointment to the National Advisory Committee for the 1961 White House Conference on Aging.

* * * *

DR. JOSEPH W. CLEARY, a partner in the Missouri Valley Clinic in Bismarck, has been certified by the American Board of Obstetricians and Gynecology and is now a diplomate of the board. Dr. Cleary is also a fellow of the American College of Obstetrics and Gynecology and a member of the North Dakota Obstetrical and Gynecological Society. He joined the Missouri Valley Clinic in September 1955 and became a partner in October 1956.

* * * *

DR. DONALD DAVIES, of Mossbank, Saskatchewan, is expected to join the staff of the Harvey Medical Center early in August. A graduate of McGill University Faculty of Medicine in Montreal, Dr. Davies did postgraduate work at Cook County Hospital in Illinois.

* * * *

DR. EUGENE TRUDEAU, of Winnipeg, recently became associated in practice with Dr. N. J. Kaluzniak in Langdon. Dr. Trudeau replaces Dr. Paul V. Adams, who plans to take four years of postgraduate study in obstetrics and gynecology at Winnipeg General Hospital. Dr. Trudeau graduated last year from the University of Manitoba Faculty of Medicine and interned at St. Boniface Hospital.

Minnesota

ON JULY 1, St. Barnabas and Swedish hospitals, Minneapolis, joined in a new medical and surgical teaching program for their interns and residents. Interesting cases among their private patients comprises most of the teaching material. Dr. Lyle K. Hay is director of intern and resident training in surgery and coordinator of the program. Dr. Frank E. Martin and Dr. Wayne L. Hoseth are co-directors in medicine. Dr. Lloyd F. Sherman is chairman of a joint council for medical education of both hospitals. The program is the first of its kind in both surgery and medicine in any Twin Cities private hospital. Mount Sinai Hospital, Minneapolis, has had a full-time director of surgical research and training almost since the time it opened in 1951.

(Continued on page 29A)

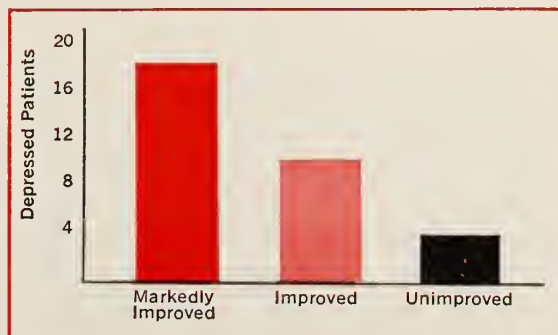
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1. Agin, H. V.: in *A Pharmacologic Approach to the Study of the Mind*, Springfield, Ill., Charles C Thomas, in press.
2. Agin, H. V.: Conference on Amine Oxidase Inhibitors, New York Academy of Sciences, Nov. 20-22, 1958.

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1. Boland, E. W., and Headley, N. E.: Paper read before the
Am. Rheum. Assoc., San Francisco, Calif., June 21, 1958.

2. Bunim, J. J., et al.: Paper read before the Am. Rheum. Assoc.,
San Francisco, Calif., June 21, 1958.

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NEWS BRIEFS

(Continued from page 27A)

OPEN HOUSE, sponsored by the Littlefork Hospital Auxiliary, was held recently at Dr. and Mrs. R. A. MacDonald's modern, new medical center. The building is situated adjacent to and is closely coordinated with the Littlefork Municipal Hospital. The rooms are arranged so that future expansion can readily be made without altering the original plan. The building and the service it will provide are distinct assets to the community.

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TWO MEDICAL EXHIBITS by members of the staff of the Mayo Clinic received awards at the annual meeting of the American Medical Association in Atlantic City. A certificate of merit was given to the exhibit, "Misleading Calcific Shadows in the Abdomen," by Dr. L. G. Bartholomew and Dr. James C. Cain, consultants in medicine, and Dr. George D. Davis, of the Section of Diagnostic Roentgenology. Honorable mention was given to the exhibit, "Tumors of the Parotid Gland: Their Surgical Management," by Dr. O. H. Beahrs, of the Section of Surgery; Dr. Kenneth D. Devine, of the Section of Plastic Surgery; and Dr. Lewis B. Woolner, of the Section of Surgical Pathology.

• • • •

DR. S. MARX WHITE, of Minneapolis, has been awarded Northwestern University Alumni Association's merit award "in recognition of worthy achievement which has reflected credit upon Northwestern University." Dr. White, one of the founders of the Nicollet Clinic, received his medical degree from Northwestern in 1897.

• • • •

PROFESSOR RICHARD G. BOND, director of the Division of Environmental Health and Safety in the University of Minnesota Health Service, was recently elected an honorary fellow of the Royal Society of Health of Great Britain. This honor is conferred upon persons who have distinguished themselves in the promotion of health.

• • • •

DR. HUGH R. BUTT, head of a section of medicine at the Mayo Clinic and professor of medicine in the Mayo Foundation, was elected president of the American Gastroenterological Association at the group's annual meeting in Atlantic City.

• • • •

DR. NORBERT J. LILLEBERG has been elected president of the Charles T. Miller Hospital in St. Paul. Dr. Edward J. Richardson was elected first vice president and Dr. C. Naumann McCloud, Jr., is second vice president. Dr. Frank J. Milnar was re-elected chairman of the Committee on Education and Research.

• • • •

DR. REGINALD G. BICKFORD, head of the Electroencephalographic Laboratories at the Mayo Clinic and professor of physiology in the Mayo Foundation, has been appointed a member of the Neurology Study Section of the National Institutes of Public Health. The section is a unit of the United States Department of Health, Education and Welfare. Dr. Bickford is also the recent recipient of a travel award conferred upon him by the Institute of Radio Engineers for his paper, "An Automatic System for the Recognition of a Spike-and-Wave Discharge," which he presented at the International Congress on Medical Electronics in Paris in June.

(Continued on page 31A)

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Surgical Technic, Two Weeks, Sept. 21, Oct. 19
Surgery of the Colon & Rectum, One Week, Sept. 21
Thoracic Surgery, One Week, Oct. 19
General Surgery, One Week, Oct. 26
Board of Surgery Review Course, Part I, Two Weeks,
Oct. 5
Fractures & Traumatic Surgery, Two Weeks, Oct. 12

GYNECOLOGY & OBSTETRICS—

Office & Operative Gynecology, Two Weeks, Sept. 28
Vaginal Approach to Pelvic Surgery, One Week, Oct. 12
General & Surgical Obstetrics, Two Weeks, Sept. 14

MEDICINE—

Electrocardiography, Two-Week Basic Course, Oct. 5
Gastroscopy & Gastroenterology, Two Weeks, Sept. 14
Internal Medicine, Two Weeks, Oct. 19

UROLOGY—

Two-Week Intensive Course, Oct. 26
Ten-Day Practical Course in Cystoscopy, by appointment

RADIOLOGY—

Clinical Uses of Radioisotopes, Two Weeks, Sept. 21

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NEWS BRIEFS

(Continued from page 29A)

DR. R. DREW MILLER, consultant in medicine at the Mayo Clinic and assistant professor of medicine in the Mayo Foundation, has been appointed assistant director of the Mayo Foundation by the Board of Regents of the University of Minnesota. Dr. Miller will, however, continue to devote approximately half his time to the practice of internal medicine at the Mayo Clinic.

* * *

DR. A. J. LEHRER has become associated in practice with Dr. F. C. Westerman in Montgomery. A graduate of St. Louis University School of Medicine, Dr. Lehrer interned at St. Joseph's Hospital, St. Paul.

* * *

DR. FRANK R. WILLIAMS has joined Dr. W. W. Rieke and Dr. D. W. Feigal as a partner in their firm in Wayzata. Dr. Williams graduated from the University of Minnesota Medical School and interned at the Presbyterian Hospital in Chicago. He practiced a year in Litchfield and then entered the Medical Corps, serving in Germany until recently.

* * *

DR. GEORGE L. WADSWORTH, superintendent of the Cambridge State School and Hospital, has resigned to become superintendent of the Clover Bottom Home in Nashville, Tennessee, and director of research in a new research facility now under construction at Clover Bottom. He will also serve on the faculty of the medical school at Vanderbilt University. Dr. Galen Adkins, former superintendent of the Sandstone State Hospital, has succeeded Dr. Wadsworth.

* * *

DR. EDWARD B. WALDMANN, who was consultant in medicine and aviation medicine at the Mayo Clinic, left Rochester in July to enter private practice in Phoenix, Arizona. In addition to his position on the Mayo Clinic staff, Dr. Waldmann has also been assistant medical director of the Rochester plant of the International Business Machines Corporation and senior flight surgeon for Wing Staff 81 of the Naval Reserve at Wold Chamberlain Field, Minneapolis.

South Dakota

DR. THOMAS H. FOX, former psychiatrist with the Veterans Administration Hospital at Fort Meade, joined the Rapid City Medical Center as staff psychiatrist in July. Dr. Fox has spent eighteen years with Veterans Administration, the last ten of which were at Fort Meade. While there, he was instrumental in forming the Rapid City Mental Health Clinic—forerunner of the present West River Mental Health Center.

* * *

DR. PERRY NELSON, who recently completed a residency in obstetrics and gynecology, established practice in Deadwood in July. He received his medical degree from the University of Nebraska and served his internship at Ancker Hospital, St. Paul. Dr. Nelson then practiced in Redfield for about one and one-half years.

* * *

DR. ERNEST SCHAUBAUER, formerly in practice in Altona, Manitoba, has established practice in Hosmer. A native of Austria, Dr. Schaubauer is a graduate of the

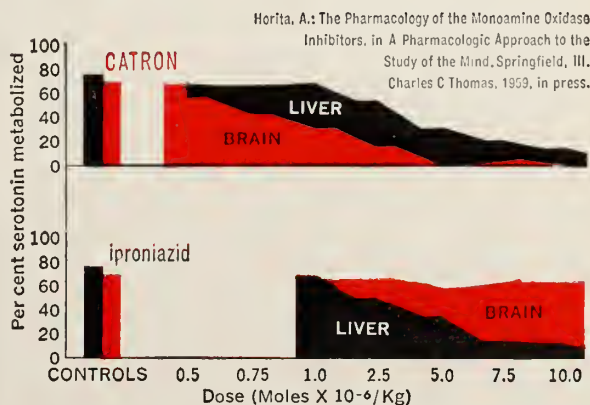
(Continued on page 32A)

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NEWS BRIEFS

(Continued from page 31A)

University of Vienna. Hosmer has been without the services of a physician for several years.

* * * *

DR. EARL E. SUCKOW, who had practiced in Garretson for about ten years, left in July for Chicago. He plans to return to Northwestern University, where he received his medical degree, to take a three-year course in surgery. Dr. Marvin Wingert, a graduate of Marquette University School of Medicine in Milwaukee, will replace Dr. Suckow.

Deaths . . .

DR. E. W. BEDFORD, 72, a Minneapolis physician and surgeon since 1920, died June 23 while vacationing in San Francisco. He was on the staffs of Doctors Memorial and St. Barnabas hospitals.

* * * *

DR. CONRAD M. DOVRE, 74, a retired St. Paul physician, died June 22 while mowing his lawn. Death was apparently due to a heart attack. A native of Oslo, Norway, Dr. Dovre came to the United States in 1905 and established practice in St. Paul in 1913 after graduating from Marquette University School of Medicine.

* * * *

DR. JOSEPH A. JACOTEL, 84, who had practiced in Milbank, South Dakota, for forty-seven years, died June 5 after an illness of several months. His death ended a long, useful, and colorful career of public service.

* * * *

DR. HERMAN LINDE, 87, of Cyrus, Minnesota, and one of the state's oldest practicing physicians until his retirement a few years ago, died May 10. In 1955, Dr. Linde's countless friends paid tribute to him in observance of his fifty years of service. On that occasion, he received messages of congratulation from many men in high state and national offices, including President Eisenhower.

* * * *

DR. REZIN REAGAN, 76, who had practiced in Sioux Falls, South Dakota, for thirty-three years before his retirement in 1953, died May 10. He was a past president of the Seventh District Medical Society and former chief of staff of McKennan and Sioux Valley hospitals, Sioux Falls. In 1953, Dr. Reagan was chosen general practitioner of the year by the South Dakota State Medical Association.

* * * *

DR. LEONARD G. ROWNTREE, 76, former chief of the Department of Medicine in the Mayo Foundation and head of a section of medicine at the Mayo Clinic, died June 2 at his home in Miami Beach, Florida. Dr. Rowntree was chiefly responsible for the beginnings of clinical investigation at the Mayo Clinic. He left Rochester in 1932 to become director of the Philadelphia Institute for Medical Research. When Dr. Rowntree moved to Florida in 1946, he intended to gradually retire. However, in 1950, he was asked to assist in founding the University of Miami School of Medicine, which was opened in 1952.

Advertisers' Announcements

NEW IMMUNIZATION AGENT

"Tetravax," a combination of 4 vaccines and toxoids developed by Merck Sharp & Dohme, Philadelphia, Pennsylvania, to provide protection against diphtheria, whooping cough, tetanus, and poliomyelitis is ready for national distribution. Merck Sharp & Dohme has been licensed to produce "Tetravax" by the National Institutes of Health. The addition of poliomyelitis vaccine to 3 standard immunizing agents for infants and children is expected not only to help extend protection against poliomyelitis but also encourage such vaccination to become routine. For maximum protection, the administration of 3 injections of "Tetravax" at monthly intervals with a fourth injection six to twelve months later is recommended. "Tetravax" provides the same degree of immunization with 4 injections that was previously provided with 4 injections of DPT and 3 injections of poliomyelitis vaccine.

FILM ON INTRAMUSCULAR IRON THERAPY

Leading hematologists both in this country and England report on new indications for intramuscular iron in a film just released by the medical education department, Lakeside Laboratories, Inc., Milwaukee, Wisconsin. Called "Intramuscular Iron Therapy," the film had its professional premiere at the recent convention of the American Association of Blood Banks in Cincinnati, Ohio. The picture, in full color and sound, was filmed in England and the United States. A highlight of the film is the radical reduction in blood transfusions during pregnancy achieved with a new iron-dextran complex administered intramuscularly.

A decrease in blood transfusions from 50 pints for every 100 deliveries to only 7 pints in the two-year period during which the preparation was studied clinically eliminates the "inherent risks" of transfusions, that is, contamination of the blood; transmission of disease, particularly homologous serum hepatitis; hemolytic reaction; allergenic reaction; circulatory overload, and hemorrhage following massive transfusions. The film is available free on loan to state and county medical societies, medical schools, and other interested medical organizations. It may be obtained from Medical Education Department, Lakeside Laboratories, Inc., Milwaukee 1.

ILOSONE SULFA FOR REFRACTORY INFECTIONS

Ilosone Sulfa, introduced by Eil Lilly and Company, Indianapolis, Indiana, is a combination of the antibiotic Ilosone with triple sulfas. Marketed as a scored, oblong tablet, Ilosone Sulfa combines the advantage of Ilosone's rapid, high, and prolonged blood levels with the support of triple sulfonamides for wider anti-infective action. Ilosone is the Lilly trademark for the propionyl ester of erythromycin.

The Ilosone Sulfa combination hits gram-positive and many gram-negative micro-organisms. It is indicated in the treatment of mixed infections, particularly of the respiratory, gastrointestinal, and genitourinary tracts. Each Ilosone Sulfa tablet contains 125 mg. of Ilosone and 167 mg. each of sulfadiazine, sulfamerazine, and sulfamethazine. The recommended dosage for adults is 2 tablets every six hours.

COMING in *October* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings*

- John E. Connolly, M.D., of San Francisco, writes on "The Use of Adrenal Cortical Compounds in Hemorrhagic Shock." Emphasized is a factor in which the adrenal cortical compounds become important and the time of administration must not be delayed. This is a new problem which was brought on by the widespread use of cortisone and in an emergency case can appear without warning. The editor of the Section on Pain, John S. Lundy, M.D., feels that this is important information to have, and it is hoped that this paper will be widely read.

- The second section of the special series on cardiovascular diseases, edited by John F. Briggs, M.D., of St. Paul, brings two papers: Sol Austrian, M.D., of St. Paul, writes on "Diagnosis and Treatment of Rheumatic Fever," and Samuel W. Hunter, M.D., of St. Paul, reports on "Surgery of Acquired Valvular Heart Disease in the Private Hospital."

- In the former article, Dr. Austrian helps to clarify thinking on the problem of diagnosis and treatment by presenting some of the current ideas about rheumatic fever and adding his own observations. In the latter article, Dr. Hunter points out that direct visualization of the aortic valve will be the more acceptable method of treatment once the subcoronary prosthesis is perfected. Until that time, however, there is some place for the more simply performed nonvisualization technics, particularly in the large private hospitals.

- R. D. Nierling, M.D., of Jamestown, North Dakota, presents an excellent clinical review of a case involving neutralized white blood counts and a subsequent appendectomy. Dr. Nierling's article bears the provocative title, "What to Do?"

- The Transactions of the North Dakota State Medical Association are concluded in this issue. The Transactions of the Woman's Auxiliary are presented, which will include committee reports, reports of the district presidents, and the membership roster listed alphabetically.

Meetings and Announcements

UNIVERSITY OF MINNESOTA MEDICAL CONTINUATION COURSES

September 22-24—Pediatrics for Pediatricians

October 5-7—Obstetrics for General Physicians

October 22-24—Dermatology for General Physicians

November 2-6—Gastrointestinal Radiography for Radiologists

For further information, write the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota.

FALL REFRESHER COURSE

The Minnesota Academy of General Practice announces its Fall Refresher Course to be held September 22 and 23 at the Radisson Hotel, Minneapolis. For reservations and further information, write Matthew K. Plasha, M.D., Chairman, Coon Rapids Clinic, Coon Rapids, Minn.

PUBLIC HEALTH CONFERENCE

Minnesota Public Health Conference will be held September 24 and 25 at the Radisson Hotel, Minneapolis. Admission to all sessions except the Chesley Memorial Banquet on Thursday evening will be by badge only. Registration and membership fee is \$2.00.

NATIONAL SOCIETY FOR CRIPPLED CHILDREN AND ADULTS

The annual convention of the National Society for Crippled Children and Adults will be held November 29 to December 2 at the Palmer House, Chicago. Workshops will be devoted to upgrading all facets of Easter Seal activity.

UROLOGY AWARD

The American Urological Association is offering its annual award of \$1,000 for essays on the results of some clinical or laboratory research in urology. First prize is \$500, second prize \$300, and third prize \$200. Competition is limited to urologists who graduated not more than ten years ago and to interns and residents doing research in urology. For details, write William P. Didusch, Executive Secretary, 1120 N. Charles St., Baltimore. Essays must reach him by December 1.

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The Journal Lancet

SERVING THE MEDICAL PROFESSION OF MINNESOTA,
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Introduction to a Series of Articles on Cardiovascular Disease

JOHN FRANCIS BRIGGS, M.D.

CARDIOVASCULAR DISEASE is the leading cause of death in this country. Despite its high death rate, optimism is still the watchword of the physician who treats cardiovascular disease. During the last few years, so many outstanding achievements have been made in the diagnosis and treatment of heart disease that many forms can now be prevented or cured. In addition, the use of newer diets, drugs, and diuretics has lessened the burden on the individual who has congestive heart failure. An understanding of hypertension has resulted in the cure of some forms and palliation in others. The disappearance of syphilitic heart disease and the control of rheumatic fever are among the great miracles of this generation. The surgical approach to the treatment of heart disease has resulted in a cure of many of our cardiovascular conditions and, again, palliation of many others.

The following series of articles has been developed to emphasize *the practical application of many of the recent advances in the diagnosis and treatment of cardiovascular disease.*

Office Diagnosis of Congenital Heart Disease

WILLIAM F. MAZZITELLO, M.D.

St. Paul, Minnesota

CARDIAC MURMURS are of interest to practitioners in all fields of medicine and generally command and bring forth a certain apprehension and concern in regard to their exact significance. The murmurs of acquired valvular disease are usually quite prominent, and, even though the exact diagnosis is not made, there is immediate awareness that underlying heart disease is present. In contrast to the above, the recognition and diagnosis of congenital cardiac defects present a somewhat more elusive and challenging problem. In such cases, the heart murmurs may or may not be clinically apparent, and it becomes even more necessary, in a sense, to look beyond cardiac auscultation alone and to evaluate the history and results of the general physical examination very closely as well as such supplementary laboratory aids as the roentgenogram and electrocardiogram.

Congenital heart disease has been classically separated into the cyanotic and acyanotic types. In this latter group, a left-to-right shunt is present, resulting in an admixture of oxygenated blood with venous blood so that the normal appearances of the skin and mucous membranes are unchanged. In these cases, the diagnosis may be, and is usually, more difficult than in the cyanotic group. This latter group is featured by a right-to-left shunt, resulting in an admixture of greatly desaturated venous blood with oxygenated blood in the greater circulation. Usually, these cases may be suspected of having some type of congenital heart disease on casual inspection of the skin, ears, lips, fingers, and mucous membranes.

Occupying a somewhat central position between the two types previously mentioned are those cases of a so-called balanced shunt, where-

in changes in central hemodynamics of the heart have reached a point at which almost equal shunting of blood takes place, both left to right as well as right to left. In these cases, minimal to moderate exertion may alter the direction of the shunt so that it becomes predominantly right to left. There may be less obvious and more complex instances of this phenomenon in many cases of this particular group.

Many busy practitioners of medicine feel that the diagnosis of congenital heart disease is difficult and can be accomplished only by highly trained individuals, such as internists or pediatricians. This is not a true concept, however, since the basic knowledge and training given to graduates of our medical schools should suffice to establish them on fairly firm diagnostic footing in regard to recognition and identification, in many instances, of the type of disease present.

That this early recognition is important is self-evident in view of the recent remarkable advances made in the surgical treatment of congenital heart disease. Thus, the awareness of underlying congenital heart disease with subsequent specific identification and evaluation by means of cardiac catheterization and angiocardiology may be the difference between acceptance or rejection, according to the surgical evaluation of the potential possibilities of correction.

In this paper, we will attempt to point out the pertinent features of the main types of congenital heart disease, cyanotic and acyanotic, that the practitioner of medicine may encounter in his office. It is beyond the scope of this paper to delve into the more complex and bizarre types of congenital cardiac abnormalities, which, in a practical sense, are relatively few and infrequently encountered even in the prominent cardiac diagnostic centers.

Prior to commencing with the foregoing, it

WILLIAM F. MAZZITELLO is clinical assistant professor of medicine at the University of Minnesota.

becomes imperative to once again stress the importance of taking an adequate history with particular reference to the degree to which physical activity is limited, frequency of respiratory infections, feeding problems, developmental characteristics as related to normals, and presence or absence of cyanosis and whether exertion is related to its manifestation. The physical examination itself, done thoroughly and with particular emphasis on inspection and auscultation, will complete the picture.

The incidence and type of congenital heart defects are still somewhat confusing if reports in the literature are to be evaluated. Examples of such may be seen in the following:

Incidence of major congenital cardiac lesions in 200 cases studied clinically by Paul Wood:

Pulmonic stenosis with ventricular septal defect	40
Atrial septal defect	35
Patent ductus arteriosus	29
Pulmonic stenosis without ventricular septal defect	24
Ventricular septal defect	24
Coarctation of aorta	16
Tricuspid atresia	6
Aortic stenosis	6
Eisenmenger complex	2
Complete transposition of the great vessels	2
Miscellaneous	16
Total	200

Incidence of the more common congenital lesions in 577 proved cases at The Children's Hospital of Boston:

Patent ductus arteriosus	101
Atrial septal defect	97
Pulmonic stenosis	83
Ventricular septal defect	68
Tetralogy of Fallot	54
Coarctation of aorta	63
Transposition of the great vessels	36
Eisenmenger syndrome	22
Tricuspid atresia	17
Total anomalous pulmonary venous drainage	13
Truncus arteriosus	11
Single ventricle	4
Ebstein's disease	2
Primary pulmonary vascular obstruction	2
Miscellaneous	4
Total	577

Regardless of which table is adhered to, it can be seen that the more common congenital cardiac defects are the following:

1. Patent ductus arteriosus
2. Atrial septal defect
3. Pulmonic stenosis with (tetralogy of Fallot) ventricular septal defect
4. Pulmonic stenosis without ventricular septal defect
5. Coarctation of aorta
6. Aortic or subaortic stenosis
7. Transposition of the major vessels
8. Ventricular septal defect

Keith, Rowe, and Vlad in their evaluation list the more common defects as follows:

Defect	Per cent total group	Prevalence in population, birth to 14 years
1. Ventricular septal defect	22	1: 4,000
2. Patent ductus arteriosus	17	1: 5,500
3. Tetralogy of Fallot	11	1: 8,500
4. Transposition of the great vessels	8	1: 11,000
5. Atrial septal defect	7	1: 13,500
6. Pulmonary stenosis with a normal aortic root	7	1: 14,000
7. Coarctation of the aorta	6	1: 16,000
8. Aortic and subaortic stenosis	4	1: 24,000
9. Ventricular septal defect with pulmonary hypertension	3	1: 33,000
10. Tricuspid atresia	3	1: 35,000
11. Atrioventricularis communis	2	1: 47,000
12. Total anomalous pulmonary venous drainage	2	1: 55,000
13. Single ventricle	2	1: 50,000

In the following breakdown of each of the main types of congenital cardiac defects previously listed, pertinent points of each will be emphasized which would be of particular help in office diagnosis.

ACYANOTIC GROUP

1. Ventricular septal defects.

History. Easy fatigue, dyspnea, exercise intolerance, and repeated severe pulmonary infections are prominent symptoms. Many of these symptoms will not be elicited until the child is 2 to 3 years of age.

Physical. Development is usually normal. A palpable thrill with a slight precordial heave is present in 85 per cent of patients, representing forceful right ventricular activity. The murmur is usually quite characteristic, being a loud, harsh grade III to IV murmur, and is best heard along the left sternal border maximal in the third and fourth intercostal spaces and, at times, over the xiphoid process. A low-pitched diastolic murmur may be heard at the apex in approximately two-thirds of patients.

X-ray. A normal to grossly enlarged heart with prominence of the pulmonary artery segment and frequent enlargement of the left atrium is shown on the x-ray.

Electrocardiogram. In most cases, the electrocardiogram is normal. About 25 per cent show left ventricular hypertrophy, 5 per cent right ventricular hypertrophy, and 5 per cent right and left ventricular hypertrophy.

2. Patent ductus arteriosus.

History. A great many of these individuals are asymptomatic, while others have symptoms of increased fatigue and dyspnea on exertion. Poor development and history of frequent respiratory infections may be present in some.

Physical. These persons may be of normal size

or short and slender. Cyanosis and clubbing are usually absent, and a systolic or diastolic thrill, at times both, may be palpated over the base of the heart. There is a harsh to and fro "machinery" murmur heard over and proximal to the pulmonic region. The murmur is usually crescendo in type during ventricular systole and decrescendo during diastole. In infants, one must be aware of the fact that only a systolic murmur may be heard.

X-ray. Slight to moderate cardiac enlargement may be seen with left atrial enlargement and prominent pulmonary artery segment and vascular markings. The aorta may be large.

Electrocardiogram. The changes herein are related to the respective size of the shunt. If the shunt is large, left ventricular hypertrophy is a common finding, whereas, if small, a normal tracing results.

3. *Atrial septal defects.* In this instance, one must delineate between classical ostium secundum and ostium primum defects.

A. *Ostium secundum*—(foramen ovale defect).

History. Generally, these individuals are relatively asymptomatic. A certain number, however, have repeated respiratory infections and are easily fatigued. There is usually some exercise intolerance.

Physical. A so-called gracile habitus with a slight degree of left precordial prominence may be noted in the majority of these patients. Cyanosis is absent as is clubbing. Moderate right ventricular precordial heave is present, and 10 per cent have a palpable systolic thrill. The characteristic murmur is usually a soft blowing systolic sound located over the left second and third intercostal spaces and poorly transmitted with an accentuated and split pulmonic second sound. It is important to note that the pulmonic split does not vary with respiration in these cases. Of great interest and, at times, confusion is the presence of a diastolic murmur at the apex resembling to a degree the apical murmur of mitral stenosis.

X-ray. Moderate enlargement of a right ventricular type is noted. The pulmonary artery segment is usually quite prominent and the pulmonary vascular markings are accentuated.

Electrocardiogram. Right ventricular hypertrophy is seen in 85 per cent of patients. Right bundle-branch block is noted in a similar percentage.

B. *Ostium primum.*

History. In contrast to those with the relatively asymptomatic ostium secundum defect, individuals with an ostium primum defect begin to

manifest exertional dyspnea, fatigue, and evidence of cardiac failure at a relatively early age. There is a greater incidence of both upper and lower respiratory infection. Cyanosis may occur infrequently but be present in some cases.

Physical. These patients are usually thin and underweight and not altogether dissimilar from the ostium secundum types, but their symptoms are more pronounced. There is some degree of precordial bulge to the left of the sternum, and a marked right ventricular precordial heave may be noted. The murmur is harsher in quality than that of the ostium secundum defect and may be confused with the murmur of an interventricular septal defect. It is usually located to the left of the sternum in the third and fourth intercostal spaces and may be transmitted widely. A palpable thrill is usually present, and the pulmonary second sound is accentuated and split. Of particular note is the finding of a systolic murmur at the apex, which may be transmitted into the axilla. This murmur is thought to be related to a degree of mitral insufficiency secondary to the cleft in the aortic leaflet of the mitral valve. This defect in the mitral valve is an intrinsic component of the ostium primum defect.

X-ray. The x-ray usually shows an enlarged heart with a dilated pulmonary artery segment and convex left border. There may also be some degree of left ventricular enlargement. Prominent pulmonary vascular markings are usual.

Electrocardiogram. Among the greatest aids to the identification of this defect are the findings of a left axis deviation in the standard leads, right ventricular hypertrophy, and a right bundle-branch block in the precordials. These findings are thought to be pathognomonic of this condition.

4. *Pulmonary stenosis with normal aortic root.*

History. A minority of these individuals are asymptomatic, but the majority have symptoms of dyspnea, fatigue, and precordial oppression. Cyanosis occurs in some patients, and squatting has been reported but is dubious. The severity of the symptoms appears to be correlated with the degree of valvular stenosis that is present.

Physical. Development is usually within normal limits. Cyanosis and clubbing may be present in about one-third of these patients. Precordial heave may be noted with a palpable thrill. There is a loud, harsh, prolonged systolic murmur over the pulmonic region. The second sound may be diminished or absent.

X-ray. The heart may be normal to enlarged in size and may show a raised, rounded apex with a prominent or bulging appearing pulmonary artery, a so-called "poststenotic dilation."

Moderate to marked diminution of the peripheral pulmonary vasculature may often be seen.

Electrocardiogram. Invariably, some degree of right axis deviation with right ventricular hypertrophy may be present.

5. *Coarctation of the aorta.*

History. Patients are generally asymptomatic, although some complain of weakness in the legs on exertion. Headaches, nosebleeds, and hypertension are clues to diagnosis.

Physical. A picture is usually presented of a well-developed and muscular individual. A systolic murmur may be heard over the precordium with a prominent elevation of the systolic blood pressure in the upper extremities as compared with the normal or femoral arteries. Diastolic murmurs are not common but when heard suggest a bicuspid aortic valve leaflet. Continuous murmurs may be heard over the back in the region of collaterals.

X-ray. Characteristic enlargement of the left heart may be seen accompanied by notching of the ribs. These findings are quite diagnostic. However, cases may be found in which these pathognomonic changes are absent, especially in children 8 years of age and younger.

Electrocardiogram. Recordings may vary from within normal limits to instances of severe left ventricular enlargement.

CYANOTIC GROUP

1. *Tetralogy of Fallot.*

History. Cyanosis is prominent, and these patients are usually quite symptomatic. Dyspnea on exertion is quite marked. Squatting is common. Exercise tolerance is quite limited. Feeding in infants may be troublesome because of rapid exhaustion.

Physical. The cyanotic changes are quite evident on casual inspection. Clubbing is also usually present. Development is retarded. A slight right ventricular precordial heave may be noted, and a palpable thrill may be present in 35 to 50 per cent of patients. Auscultation reveals a systolic murmur of grade 3 to 4 intensity, which is heard best at the lower left sternal border. The first heart sound is usually loud at the

apical region, while the second sound is diminished at the pulmonic area and unsplit but accentuated near the sternal borders in the third and fourth intercostal spaces. There may be cases, however, in which the murmurs diminish in intensity according to the respective anatomic variations of the defects.

X-ray. The apex of the heart is raised off the diaphragm, and the left border is quite concave. The pulmonary vascular shadows are diminished. The aorta is large.

Electrocardiogram. About 95 per cent of patients show a right axis deviation with evidence of right ventricular hypertrophy.

2. *Transposition of the major vessels.*

History. Generally, these individuals are quite markedly cyanotic and may have severe feeding difficulty, becoming quite dyspneic. Secondary respiratory complications are not unusual.

Physical. Poor development with pronounced cyanosis is characteristic, presenting a somewhat wizened appearance. Murmurs may be minimal, or, at times, a grade IV harsh systolic murmur may be present. The pulmonic and aortic sounds are present to a fairly normal degree. Thrills are not usually palpable. The heart usually is enlarged diffusely.

X-ray. Narrow root shadows appear at the base with a rounded, convex left border and enlargement.

Electrocardiogram. About one-quarter of patients have a normal electrocardiogram; one-quarter show right ventricular hypertrophy; one-fifth may show left ventricular hypertrophy; and one-fifth show evidence of combined hypertrophy.

SUMMARY

In the foregoing simple classifications and descriptions, a working outline has been presented which may help to more easily recognize and delineate the more common congenital lesions. The congenital cardiac conditions not listed are quite infrequent and complex and thus have not been included in this brief review. The more common types in both the cyanotic and acyanotic groups have been listed.

Some Aspects of the Surgery of Congenital Heart Disease

LLOYD D. MACLEAN, M.D.

St. Paul, Minnesota

IN 1947, TAUSSIG stated that "... the time may come when every patient with an isolated patent ductus arteriosus should receive the benefit of surgical ligation."¹ The tremendous progress in the surgery of congenital heart disease in the past twelve years makes it difficult at this time to even summarize those abnormalities for which surgery is being regularly and successfully employed.

PATENT DUCTUS ARTERIOSUS

This condition, the most ancient of all congenital cardiac defects to be described, was first studied by Galen in the second century A.D. The physiologic abnormality is now well known. In the average case, about 50 per cent of the left ventricular output is shunted from the aorta into the pulmonary artery. The time of functional closure of the ductus arteriosus is not entirely settled, but recent observations have shown that, by the end of the first week of life, the normal ductus arteriosus will no more than admit a 2 mm. probe.² The size and shape of the persistent ductus varies remarkably.

Surgery is usually indicated with the establishment of the diagnosis in all typical cases except perhaps in the aged.³ The complications likely to develop in the patient with patent ductus arteriosus are congestive heart failure, subacute bacterial endocarditis (especially in the adult), and aneurysm of the ductus.

Of great interest is a special group of patients in whom a large heart and cardiac failure develop in infancy. It is of great importance to study these infants thoroughly by catheterization, if necessary, in order to detect this isolated abnormality, because surgical closure produces a particularly gratifying result. A systolic rather than continuous or machinery murmur is typical of patent ductus arteriosus in childhood.

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Few physicians doubt the importance of and necessity for surgery in patent ductus arteriosus. Serious symptoms develop in later life in practically all untreated cases.⁴ Uncomplicated cases are best operated upon between 3 and 6 years of age. The group of symptomatic infants with large hearts requires operation as soon as the diagnosis is confirmed. The good results from surgery are now very clear.^{5,6}

COARCTATION OF THE AORTA

An early description was made from the post-mortem examination of a monk by Morgagni in 1760. Many cases were reported during the nineteenth century.

While often symptomless in the first decade or two, a significant degree of hypertension and cardiac failure develops in mid-adult life in the majority of patients with coarctation of the aorta. Blackford⁷ found that, in a large series of 323 cases, 40 per cent died between the ages of 16 and 30 years. Gross⁸ has an operative mortality under 2 per cent for this condition.

In the postductal or adult type of coarctation of the aorta, there is a localized constriction due to medial thickening that amounts almost to a diaphragm. Patients with this type of coarctation die of rupture of the aorta, intracranial hemorrhage, heart failure, subacute bacterial endocarditis, and dissecting aneurysms.

Preductal or infantile coarctation of the aorta may be a localized constriction, or the constriction may extend into the aortic arch. Associated defects are extremely common, occurring in 80 per cent of the cases, when the coarcted segment extends into the aortic arch proximal to the left subclavian artery. These defects include transposition of the great vessels, atrioventricularis communis, and single ventricle.⁹

The optimal time for repair is between 8 and 16 years of age. In the third decade or later, the aorta is less elastic and aneurysms are more frequently encountered; bleeding from collateral blood vessels is more common and more difficult

to control, and the operation, therefore, carries a greater risk. In a small group of infants in whom cardiac failure develops, correction of the coarctation should be performed when diagnosed. This may require an emergency operation to be successful. Coarctation of the aorta is the second leading cause of heart failure in infancy and childhood!

ATRIAL SEPTAL DEFECTS

In atrial septal defects, phenomenal degrees of transatrial shunts from left to right may occur even with normal pulmonary artery pressure. There are 4 main types of interatrial openings: (1) foramen ovale defects, (2) high defects, (3) continuous defects of both foramen ovale and high septum, and (4) low defects. This classification, suggested by Lewis,¹⁰ is the product of his observations in the living heart at the time of open repair. The high defects are located above the fossa ovale and are regularly associated with anomalous drainage of the right superior and, sometimes, of the right middle or inferior pulmonary vein. The low defects, which involve the septum primum, are associated with a cleft aortic cusp of the mitral valve.

The clinical indications for surgical correction include most cases in which the lesion may be *clinically* diagnosed. Precise diagnosis before surgery allows one to use appropriate techniques to deal with anomalous pulmonary venous drainage or cleft mitral valve. The patients with atrial defects who need surgical correction most urgently are those with the low defects and those with ostium secundum defects who have associated defects. Most workers in the field at the present time favor the use of a pump-oxygenator and open heart repair of these defects.

A number of devices have been utilized for the extracorporeal oxygenation of blood. Comparable results have been achieved with oxygenators of quite different design and principle. Experience with a given apparatus appears to be of most importance.

VENTRICULAR SEPTAL DEFECTS

Roger, in 1879, first described the clinical signs of ventricular septal defect together with the underlying pathology. An anatomic classification by Rokitsky in 1875 preceded that of Roger and is favored today by the cardiac surgeons at the University of Minnesota.¹¹ The extreme example is absence of the septum. The patency of a smaller defect may reside in the anterior or posterior part of the septum. In both of these sites, the aortic and pulmonary trunks may be normally or abnormally sited.

For example, the defect may reside in the anterior septum with normal great vessels or in association with obstructive lesions of the pulmonary artery (tetralogy of Fallot).

Open heart methods are used in the repair of these defects. This was first accomplished by Lillehei and Varco and reported in 1955.¹²

The best surgical results are obtained in patients with relatively low pulmonary resistance who are over 2 years of age. Infants under 2 years of age with evidence of congestive heart failure are poorer operative risks but have an extremely poor prognosis without surgery. It is quite clear that ventricular septal defects exact a high toll of life during infancy and early childhood in contradistinction to interatrial septal defects of the septum secundum variety.

PULMONARY STENOSIS

Pulmonary stenosis was first described by Morgagni in 1761. The stenosis may be valvular, infundibular, or both. Recent reports indicate that combined valvular and infundibular stenosis is rare if, indeed, it exists at all. It is, however, common to find a reduction in the size of the infundibulum in association with severe valvular stenosis due to marked muscle hypertrophy. A large gradient of pressure between the right ventricle and pulmonary artery may persist for some months following adequate surgery on a valvular stenosis. Later catheterization in such cases shows a lowering or disappearance of the gradient when nothing has been done surgically to the infundibular area.

The complications most likely to be encountered with pulmonary stenosis are congestive heart failure, anoxic spells, and subacute bacterial endocarditis. Symptoms cannot be relied upon as indications for operation, for, in many patients, the first symptoms appear immediately prior to death. A systolic pressure of 75 mm. Hg in the right ventricle or a gradient between ventricle and pulmonary artery of 50 to 75 as a minimum is a definite indication for surgery. A right ventricular strain pattern on the electrocardiogram is an indication for prompt surgical correction.

When pulmonary stenosis is associated with cyanosis, a shunt is present, and angiocardiology may be required to accurately locate the level of the shunt. A left-to-right shunt may exist with pulmonary stenosis. These patients do not have cyanosis (acyanotic tetralogy), and the results of open heart repair for them have been better than in typically cyanotic tetralogy patients.

Palliative or curative procedures are currently

being performed for other anomalies, including complete transposition of the great vessels, tricuspid atresia, congenital mitral stenosis, anomalies of venous return, aortic-pulmonary septal defect, and vascular rings.

SUMMARY AND CONCLUSIONS

The unique characteristics of the most common congenital cardiac defects are briefly described, and indications for surgery and the results of surgery are discussed.

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AFTER SUBTOTAL THYROIDECTOMY for toxic diffuse exophthalmic goiter, approximately 15 per cent of patients observed for twenty-eight to thirty-four years had recurrences. This rate is no doubt higher than it would be for persons treated more recently, since patients were not prepared as satisfactorily for operations three decades ago. Strong Lugol's solution was used in every instance, and the operation was carried out more rapidly. Less radical procedures also meant more frequent recurrences.

In 82 patients studied, life expectancy was as long as that of the general population.

Of 74 patients for whom complete data were obtainable, only 1 had cancer, which was a tumor of the breast. Only 7 subsequently had heart trouble, with 3 deaths. Incidence of cholecystitis was also strikingly lower than in the adult female population, although most of the patients were women. Incidence of fewer strokes and myocardial infarctions suggests that arterial obstructions of the coronary, cerebral, and internal carotid vessels were less frequent.

ROBERT W. BARTLETT, M.D., Washington University, St. Louis. *Arch. Surg.* 78:703, 1959.

Femoral Shaft Fractures

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WHEREVER POSSIBLE, the patient who has obviously sustained a femoral shaft fracture or who is suspected of having such an injury should be splinted where he lies. Although it is not feasible to splint every fracture at the scene of the accident, it seems only reasonable to assume that the majority of such injuries can be properly treated either with a Thomas splint or some improvised substitute. Since automobile and industrial accidents account for a large number of these fractures, transportation to the hospital is usually accomplished by means of an ambulance or some similar emergency vehicle. Certainly, these vehicles should be equipped with Thomas splints and their crews adequately trained in the application of such an appliance. When this equipment is not available, axillary to foot board splints and strapping the injured extremity to the unaffected extremity are methods which provide satisfactory immobilization. By utilizing some form of splint, soft tissue, vascular, and, possibly, nerve damage will be avoided in many cases. Furthermore, the pain factor as well as the incidence of fat embolism will be reduced if the injured extremity is not subjected to unnecessary manipulation during the emergency management. The patient should be given medication for pain prior to being transported to the hospital except in cases of head injuries.

ANATOMY

Angulation and overriding of the fragments are prone to occur because of the powerful anterior and posterior thigh musculature. In general, the displacement of the fragments depends upon the forces exerted at the time of injury as well as

upon the pull of attached muscles. For example, comminuted fractures of the femoral shaft are usually the result of direct violence, whereas spiral fractures are associated with torsion injuries. Gravity also contributes to the deformity in that the distal fragment commonly rotates outward. As a rule, the deformity varies with the level of the fracture. In fractures involving the upper third of the shaft, the proximal fragment is flexed, abducted, and externally rotated. The distal fragment is displaced posteriorly and adducted. Although nothing is consistent about the displacement of the fragments in fractures of the middle third of the shaft, overriding with flexion of the proximal fragment and posterior displacement of the distal segment are usually found. Due to the forces exerted by the gastrocnemius muscle, the distal fragment is usually displaced posteriorly with some overriding in fractures of the lower third. Sciatic nerve and femoral artery injuries are uncommon because of the heavy muscle surrounding the femur.

CHOICE OF TREATMENT

The patient's general condition should be carefully evaluated prior to any definitive fracture treatment. Examination should rule out the possibility of associated abdominal, chest, and head injuries. In many cases, shock has to be controlled and hemorrhage into the thigh compensated for. In the latter instance, the fact should be kept in mind that the femoral shaft is rich in blood supply from both nutrient vessels and the heavy musculature surrounding the bone. Hence, hemorrhage of 2 or more liters is not uncommon. With the associated soft tissue damage, electrolyte loss may be sufficient to necessitate replacement. These complications should be suspected in cases in which the thigh is swollen and the

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skin tense. Comparative circumferential measurement of the thighs is a helpful method of confirming the presence of such hemorrhage. The complication of fat embolism must always be considered, especially in cases of multiple fractures involving the lower extremities. Generally speaking, the average femoral shaft fracture can be adequately managed by utilizing either skeletal traction or intramedullary fixation. If the physician is not experienced in the techniques of intramedullary fixation, balanced skeletal traction usually suffices. Ordinarily, skeletal traction employing a Kirschner wire or Steinmann pin through the proximal tibia or distal femur is considered preferable to skin traction. When continuous traction is required, skin traction presents certain disadvantages. First of all, this method limits the traction to 8 or 10 lb. This amount of weight is usually insufficient to obtain or maintain reduction. Second, skin traction is contraindicated in conditions such as diabetes and arteriosclerosis. Finally, traction of this type is inadvisable where the skin has been damaged. External pin-splint methods of treating closed fractures of the femoral shaft are to be discouraged.

CLOSED FRACTURES

Stable transverse fractures of the middle third of the femoral shaft are frequently amenable to manipulation followed by immobilization in a hip spica cast until union is complete. Comminuted or overriding fractures at this level may be managed by continuous skeletal traction combined with a suspended splint. Fractures involving the proximal and distal thirds may be treated in a like manner. When skeletal traction is utilized, reduction should be obtained as rapidly as possible, at least within the first forty-eight hours. Twenty-five to 35 lb. may be necessary to obtain reduction, and x-rays should be repeated no less than once a day until this is accomplished. Thereafter, the weight may be reduced to an amount which maintains proper position and alignment of the fragments. Traction is discontinued and a hip spica cast applied when the fracture site is firm. The cast is removed when union is well established. A certain number of these closed shaft fractures are ideally suited to open reduction and internal fixation. Although fractures as high as the lesser trochanter can be fixed with an intramedullary nail, comminuted subtrochanteric fractures are in some instances best controlled with blade-plate fixation. The elective operative treatment of closed fractures is left to the discretion of the surgeon.

OPEN FRACTURES

These injuries require immediate surgery providing the patient's general condition permits. The results are more gratifying if treatment is carried out within eight to twelve hours after the accident, with the realization, of course, that this period of time has become more flexible since the introduction of antibiotics. In the ideal case in which one is dealing with a clean wound, debridement followed by reduction and internal fixation is often desirable. In extensive, contaminated open fractures of the femoral shaft, initial debridement and closure followed by the application of skeletal traction represents an acceptable method of treatment. In cases that are also suited to intramedullary fixation, the initial skeletal traction may be supplemented by a nail after two or three weeks providing the wound has healed without infection.

INTERNAL FIXATION

Currently, the intramedullary nail has, to a great extent, replaced plate fixation of femoral shaft fractures. This form of treatment is best suited to fractures involving the proximal and middle third of the shaft. Generally speaking, fractures involving the distal third of the shaft are not suited to intramedullary fixation. Certain comminuted fractures of the femur can be fixed by means of an intramedullary nail supplemented with screw or screw-plate fixation. This is particularly true in the case of spiral fractures or in cases in which a large butterfly fragment is involved. If one is not acquainted with the techniques of intramedullary fixation, the slotted plate should be utilized. The use of a nonslotted plate is to be condemned. In the latter case, impaction of the fragments is mechanically impossible, and this, of course, is conducive to delayed and nonunion. The intramedullary nail is unique in that it permits early mobilization of the extremity, and, in the average case, the period of hospitalization is considerably reduced. Pathologic fractures of the femoral shaft also represent an indication for the use of the intramedullary nail.

COMPLICATIONS

Nonunion is a relatively infrequent complication of femoral shaft fractures. The rich blood supply derived from nutrient vessels and the heavy musculature about the femur account for this fact. Distraction of the fragments due to excessive traction, unsatisfactory internal fixation, infection, inadequate immobilization, or a concomitant nutritional problem represents the common causes of nonunion. This complication can best be treated by internal fixation combined with a

bone graft and cast. Malunion in the form of angulation or shortening is not uncommon because of the pull exerted on the fragments by the powerful thigh muscles. Open fractures or closed fractures treated by open methods may be complicated by osteomyelitis. The standard methods of treatment, including adequate drainage, sequestrectomy, saucerization, and the administration of antibiotics, usually result in control of the infectious process. The femoral shaft fracture primarily fixed by means of an intramedullary nail and complicated by infection frequently progresses to union in the face of chronic drainage. Severely comminuted or displaced fractures of the femoral shaft with extensive damage to the quadriceps musculature are the most common causes of limited knee joint motion. This results from the scarring of the quadriceps musculature to the femoral shaft. Such scarring may also follow open reduction and internal fixation. Usually, manipulation of the knee joint does not significantly improve the range of motion when this condition exists. Intensive exercises are sometimes beneficial, and, in extremely resistive cases, quadricepsplasty is indicated. Adhesions within the knee joint may result in restricted motion. They, of course, can be avoided by the use of a Pearson attachment when the Thomas

splint and traction are employed. With this method of treatment, active knee joint exercises are permitted in traction while healing is taking place. It should also be remembered that the quadriceps mechanism may be exercised while the extremity is immobilized in a cast. In cases in which initial damage to the knee joint has occurred, the patella may become fixed to the femoral condyles. Here again, exercises and, in some cases, careful manipulation are beneficial. In general, it is well to flex the knee approximately 10 to 15° whether splint traction or cast treatment is being used. Permanent knee joint stiffness does not develop in most young and middle-aged patients even with three or four months of immobilization providing there has been no initial joint injury.

SUMMARY

A comprehensive review of the emergency management and treatment of femoral shaft fractures in adults has been presented. In general, most shaft fractures can be adequately treated by closed methods utilizing skeletal traction. Internal fixation with an intramedullary nail or slotted plate is indicated in selected cases. The intramedullary nail has, to a great extent, replaced plate fixation of femoral shaft fractures.

MANIPULATION EASILY REDUCES incomplete dislocation of the radial head, which has resulted from traction on the extended and pronated forearm. The injury usually occurs in children 2 to 4 years old who have been lifted by the arm or have stumbled while walking with the hand held.

To reduce the subluxation, the child's elbow is grasped in one hand and slight pressure is applied with the thumb on the head and neck of the radius. At the same time, the child's forearm is held at the wrist with the opposite hand and extended and forcibly supinated. The shaft of the radius may be pushed upward against the capitellum concurrently.

A click is felt as reduction is accomplished, and pain and limitation of supination disappear. A sling is used for a few days, and forearm traction is avoided for several weeks.

GEORGE M. HART, M.D., Northwest Clinic, Minot, North Dakota. J.A.M.A. 169:1734, 1959.



Charles N. Hensel, M.D.

1882-1959

J. ARTHUR MYERS, M.D.

"IF MY BROTHER, Elliott, hadn't crawled down a sewer opening at Fairmount and St. Albans Streets in St. Paul and lit a match, I would have been an engineer instead of a doctor."

Charles Hensel was finishing the second year of engineering at the University of Minnesota in the spring of 1903 when one afternoon his younger brother, Elliott, was brought home severely burned about the face and hands. Charles spent many weeks thereafter changing his brother's dressings and watching the growth of the skin grafts placed on the deep burns of his forehead.

Through the next year in the engineering college, he struggled with the decision as to whether to become a doctor or to go on with engineering and try to become a famous engineer like his uncle, General Herman Haupt, who had built the Hoosac Tunnel in western Massachusetts in 1875 and was later general manager of the Northern Pacific Railway. This was the reason Charles' parents had moved from Philadelphia to Fargo, North Dakota, where he was born March 3, 1882.

When the family moved to St. Paul in the summer of 1887, the Welzbach gas mantle, the coal stove, dirt streets, wooden sidewalks, and horse-drawn street cars were in vogue.

In due time, Charles attended Irving and Webster schools and Mechanic Arts High School. In the fall of 1901, he entered the University of Minnesota and was graduated from the medical school in 1908.

He spent the next six months as an intern in the hospital at Two Harbors, Minnesota. Beginning in December 1908, he spent a year as an intern in the City and County (now Ancker) Hospital in St. Paul.

"Those were the days when typhoid fever had not been brought under control, when smallpox was epidemic, when cases of pulmonary tuberculosis would

turn up in the general wards, when rheumatic fever and rheumatic heart diseases were abundant, and when many people died from lobar pneumonia."

The pavilion for contagious diseases was filled with cases of scarlet fever, measles, and diphtheria. Von Behring's antitoxin was so often administered too late and in too small doses to save many lives. Cases of syphilis were also prevalent and were treated with mercury rubs and iodides.

The surgery of those days was simple, and the anesthetic was usually ether administered by an unskilled intern. Patients were usually kept flat in bed for ten to fourteen days after surgery. Postoperative pneumonia and thromboses were common.

After completing his internship, Dr. Hensel practiced general medicine for three years.

In the fall of 1914, he became an assistant to the late Dr. Charles Lyman Greene, chief of the Department of Medicine at the University of Minnesota Medical School. Dr. Greene enjoyed a large consulting practice in internal medicine with special interest in diseases of the heart.

In 1915, Dr. Hensel was instructed in the technic of taking x-ray films of the heart and lungs. About the same time, he was taught to use the sphygmometer for determining blood pressure levels and Mackenzie's polygraph for recording pulse waves in the neck and wrist.

Dr. Greene placed great emphasis upon auscultation of the heart, and, since rheumatic heart disease was common in those days, learning to differentiate heart sounds was especially important.

The association with Dr. Greene also provided Dr. Hensel with an opportunity to watch Dr. Ralph Morris, also an associate of Dr. Greene, master the technic of a newly acquired Cambridge electrocardiograph during the year 1917.

In 1920, after serving six years of apprenticeship

under Dr. Greene, Dr. Hensel opened an office for the practice of internal medicine and cardiology. He continued in this field for the remainder of his active life.

In 1926, he spent six months of study in the Medical School of Vienna, and, in 1928, another six months were spent there doing postgraduate work in diseases of the chest.

In addition to membership in his county, state, and the American Medical Association, Dr. Hensel was elected to membership in the American College of Physicians in 1927. In 1924, he was a founding member of the Minnesota Society for the Study of

Diseases of the Heart and Circulation. In 1947, he was also a founder of the Minnesota Society of Internal Medicine and the Minnesota Heart Association. He was a fellow of the American College of Allergists and was nominated for membership in the Academy International of Medicine in 1944. He was certified by the American Board of Internal Medicine in 1937. In 1954 and 1955, he was president of the Minnesota Academy of Medicine.

Dr. Hensel had always enjoyed excellent health. However, after returning from an eastern trip, pneumonia developed from which he died after thirty-six hours on April 6, 1959.

Lancet Editorial

Refresher Courses and Special Series

WELL ORGANIZED REFRESHER COURSES for practicing physicians provide excellent opportunities for keeping abreast of advances in diagnosis, prognosis, treatment, and prevention of various diseases and conditions. However, registration in such courses may necessarily be limited in number. Moreover, it is not always convenient for physicians to leave their practices long enough to take such courses. Therefore, the idea was conceived of publishing a series of articles in various fields bringing up-to-date information to the desks of all readers of JOURNAL-LANCET who are not able to take special refresher courses.

The first series, devoted to "Communicable Diseases," was introduced in November 1958, and most succeeding issues have carried articles in this field. In January 1959, a series was begun on "Fractures and Related Trauma." These articles have been so enthusiastically received that they are being continued, and others are in the offing. It is with much pride that we introduce in this issue a special series of articles on "Cardiovascular Disease," consisting of at least 16 short, concise papers containing up-to-the-minute information.

Other series scheduled to appear in due time include "Animal Diseases Transmissible to Man," "Diabetes," "Ear, Nose and Throat," "Obstetrics and Gynecology," "Ophthalmology," "Urology," and others.

Several subscribers have proposed that at the end of an appropriate part or a complete series, all of the papers be brought together in a brochure. This can be done if a sufficient number promptly indicate their desire.

J. ARTHUR MYERS, M.D.

Hybrid Vigor in Medical Science

IT IS AN OLD STORY in animal genetics that the offspring of crosses between different strains are likely to grow faster and live longer than inbred lines. There is an analogous situation in scientific productivity. In any particular culture, there are stereotyped ways of looking at problems. Any one of us sees possible solutions to problems in the context of one's own background of information and pattern of thinking. In fact, one even visualizes and formulates the problems themselves in the frame of reference of one's background.

The history of science is replete with examples of extraordinarily fruitful outcomes of cross-fertilization from one culture to another. A case from medical science in recent years is that of the so-called tranquilizing drugs. One of the major ones, reserpine, came from an ancient herb remedy used in India. Another group came from France. In both cases, the genius of American development and production, not to mention sales promotion, made the original products and new ones available for use on a mass basis within months rather than the decades which might, and probably would, otherwise have been required.

Another medical example is in the use of stored blood. In these days when origins of ideas are conveniently forgotten or buried in the welter of publications in science, which I estimate to be at least fifty million pages of "new" material per year, it may be worth recalling that the first "blood banks" were developed in Russia in the early 1930's to store cadaver blood. From that origin, the safety and utility of the system was proven and the more convenient mass, living donor system evolved in this country.

It hardly needs mention that the sulfonamides had their origin in Germany, arising out of meticulously painstaking screening studies for which the German temperament seems so well fitted, and

that penicillin came from the inspired interpretation of a chance observation by an astute British bacteriologist. In both cases, cultural patterns true to form produced the advance. Particularly in the latter case, the developmental and productive capacity of American industry made the discovery useful sooner than might otherwise have been the case.

These examples should serve to demonstrate how wise it would be for the United States to adopt the policy advocated by Senators Lister Hill and Hubert Humphrey, among others, of promoting international cooperation in medical research on a large scale.

Let any physician ask himself what he would do today if he were deprived of the sulfonamides and the antibiotics. Let several pharmaceutical houses ask themselves what they would do for income if those agents and the ataractic drugs were off their lists. Obviously, the modern pharmacopeia has been revolutionized at least as much by these and other "foreign" medical advances, as by home grown original discoveries and developments.

In spite of these plain facts many Americans, even physicians, pretend to see no great need or desire for international cooperation in medical research. False patriotism, short memories, indolence in study habits, the decline in reading of foreign language literature even by so-called scholars, the habit of modern writers to consider anything more than a year or two old to be ancient history—all of these factors and more conspire to make many of us really believe that everything of merit is "Made in America." This chauvinistic attitude is stupid and ignorant wherever it exists, but it is unpardonable in medicine. Twentieth century medicine needs "hybrid vigor" today just as it did in the past and will in the future.

MAURICE B. VISSCHER, M.D.

Transactions of the North Dakota State Medical Association

SEVENTY-SECOND ANNUAL MEETING

Bismarck, North Dakota, May 2, 3, 4 and 5, 1959

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Fourth District	D. J. HALLIDAY, Kenmare
Fifth District	G. CHRISTIANSON, Valley City
Tenth District	K. G. VANDERCON, Portland

Terms expiring 1961

Second District	G. W. TOOMEY, Devils Lake
Seventh District	T. E. PEDERSON, Jamestown
Ninth District	A. R. GILSDORF, Dickinson
Eighth District	J. D. CRAVEN, Williston

Councillor at large

R. W. RODGERS	Dickinson
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COUNCIL: Officers; executive committee

A. R. GILSDORF, Chairman
V. G. BORLAND, Vice-Chairman
C. H. PETERS, Secretary

BOARD OF MEDICAL EXAMINERS

Terms expiring 1959

JOSEPH SORKNESS	Jamestown
O. W. JOHNSON	Rugby
H. L. REICHERT	Dickinson

Terms expiring 1960

C. J. GLASPEL	Crafton
R. O. GOEHL	Grand Forks
W. A. WRIGHT	Williston

Terms expiring 1961

C. A. ARNESON	Bismarck
V. G. BORLAND	Fargo
D. J. HALLIDAY	Kenmare

HOUSE OF DELEGATES

FIRST DISTRICT

ARTHUR C. BURT	Fargo
ELMER BEITHON	Wahpeton
F. M. MELTON	Fargo
W. L. MACAULAY	Fargo
F. DE CESARE	Fargo
L. G. PRAY	Fargo
H. A. NORUM, alternate	Fargo
D. J. JAEHNING, alternate	Wahpeton
J. F. HOUGHTON, alternate	Fargo
L. E. WOLD, alternate	Fargo
R. J. ZAUNER, alternate	Fargo
J. F. SCHNEIDER, alternate	Fargo

SECOND DISTRICT

WILLIAM R. FOX	Rugby
R. M. FAWCETT	Devils Lake
D. W. PALMER, alternate	Cando
JAMES MAHONEY, alternate	Devils Lake

THIRD DISTRICT

FRANK A. HILL	Grand Forks
W. C. DAILEY	Grand Forks

G. L. COUNTRYMAN
R. E. MAHOWALD
R. C. PAINTER
JOHN A. SANDMEYER, alternate
W. P. TEEVENS, alternate
R. H. DE LANO, alternate
JOHN H. GRAHAM, alternate
WELLDE W. FREY, alternate

FOURTH DISTRICT

F. D. NAEGELI	Minot
A. F. HAMMARGREN	Harvey
V. J. FISCHER	Minot
M. W. GARRISON	Minot
S. E. SHEA, alternate	Minot
J. L. DEVINE, JR., alternate	Minot

FIFTH DISTRICT

NEIL A. MACDONALD	Valley City
C. J. KLEIN, alternate	Valley City

SIXTH DISTRICT

M. A. K. LOMMEN	Bismarck
MILTON NUGENT	Bismarck
R. B. TUDOR	Bismarck
CARL BAUMGARTNER	Bismarck
EDMUND VINJE	Hazen

SEVENTH DISTRICT

J. N. ELSWORTH	Jamestown
J. M. VAN DER LINDE	Jamestown
JOHN SWENSON, alternate	Jamestown
ROBERT E. LUCY, alternate	Jamestown

EIGHTH DISTRICT

D. R. STRINDEN	Williston
H. C. WALKER, JR., alternate	Williston

NINTH DISTRICT

R. F. GILLILAND	Dickinson
KEITH FOSTER	Dickinson
R. E. HANKINS, alternate	Mott
W. J. KNICKERROCKER, alternate	Hettinger

TENTH DISTRICT

R. W. MCLEAN	Hillsboro
JAMES LITTLE, alternate	Mayville

STANDING COMMITTEES

Committee on Medical Education:

H. M. BERG, Chairman	Bismarck
T. E. PEDERSON	Jamestown
T. H. HARWOOD	Grand Forks
L. H. KERMOTT, JR.	Minot
J. H. MAHONEY	Devils Lake
M. T. LAMPERT	Minot
ROBERT PAINTER	Grand Forks
NORMAN ORDAHL	Dickinson
WM. BUCKINGHAM	Elgin
L. E. WOLD	Fargo
R. J. ULMER	Fargo

Committee on Necrology and Medical History:

E. H. BOERTH, Chairman	Bismarck
A. R. SORENSON	Minot
H. E. FRENCH	Grand Forks
R. E. LEIGH	Grand Forks
WM. LONG	Fargo
P. G. ARZT	Jamestown
D. J. HALLIDAY	Kenmare

Committee on Legislation:

O. W. JOHNSON, Chairman	Rugby
C. H. PETERS, Vice-Chairman	Bismarck
H. L. REICHERT	Dickinson

J. N. ELSWORTH	Jamestown	MARSHALL LANDA	Fargo
P. O. DAIL	Bismarck	R. M. FAWCETT	Devils Lake
L. F. PINE	Devils Lake	<i>Committee on Veterans Medical Service:</i>	
ROBERT MC LEAN	Hillsboro	A. C. FORTNEY, Chairman	Fargo
DAVID JAEHNING	Wahpeton	AMOS GILSDORF	Dickinson
PERRY O. TRIGGS	Fargo	R. B. RADL	Bismarck
R. O. GOEHL	Grand Forks	H. A. NORUM	Fargo
C. M. LUND	Williston	RALPH MAHOWALD	Grand Forks
J. L. DEVINE, JR.	Minot	<i>Committee on Nursing Education:</i>	
RUDOLPH FROESCHLE	Hazen	C. R. MONTZ, Chairman	Bismarck
J. H. MAHONEY	Devils Lake	LLOYD RALSTON	Grand Forks
RALPH MAHOWALD	Grand Forks	R. O. SAXVIK	Jamestown
<i>Committee on Public Relations:</i>		HANS GULOIEN	Dickinson
JOHN CARTWRIGHT, Chairman	Bismarck	E. P. BRYANT	Devils Lake
R. O. GOEHL	Grand Forks	C. B. DARNER	Fargo
KEITH VANDERSON	Portland	R. S. LARSON	Velva
H. L. REICHERT	Dickinson	<i>Committee on Maternal and Child Welfare:</i>	
C. M. LUND	Williston	R. E. LUCY, Chairman	Jamestown
R. S. LARSON	Velva	J. H. MOORE	Grand Forks
J. N. ELSWORTH	Jamestown	L. G. PRAY	Fargo
L. F. PINE	Devils Lake	JOHN GILLAM	Fargo
P. O. TRIGGS	Fargo	CARL BAUMGARTNER	Bismarck
ROBERT KLING	Bismarck	E. P. BRYANT	Bismarck
<i>Committee on Official Publication:</i>		BLAINE AMIDON	Fargo
E. H. BOERTH, Chairman	Bismarck	JOHN KELLER	Williston
P. L. BLUMENTHAL	Mandan	R. T. GAMMELL	Kenmare
JOSEPH CLEARY	Bismarck	J. D. CRAVEN	Williston
<i>Committee on Public Health:</i>		W. B. ARMSTRONG	Fargo
PERCY OWENS, Chairman	Bismarck	<i>Committee on Diabetes:</i>	
C. O. MC PHAIL	Crosby	E. A. HAUNZ, Chairman	Grand Forks
A. F. HAMMARGREN	Harvey	A. K. JOHNSON	Williston
H. J. WILSON	New Town	R. M. FAWCETT	Devils Lake
R. F. GILLILAND	Dickinson	P. ROY GREGWARE	Bismarck
JOHN MOORE	Grand Forks	MARTIN HOCHHAUSER	Garrison
W. L. MACAULAY	Fargo	DONALD BARNARD	Fargo
P. L. BLUMENTHAL	Mandan	W. H. WALL	Wahpeton
RICHARD RAASCH	Dickinson	K. G. FOSTER	Dickinson
GALE RICHARDSON	Minot	KENNETH AMSTUTZ	Minot
<i>Committee on Medical Economics:</i>		B. HORDINSKY	Drake
C. H. PETERS, Chairman	Bismarck	<i>Committee on Crippled Children:</i>	
TED KELLER	Rugby	PAUL JOHNSON, Chairman	Bismarck
V. J. FISCHER	Minot	C. W. HOGAN	Jamestown
E. J. LARSON	Jamestown	A. E. CULMER, JR.	Grand Forks
V. G. BORLAND	Fargo	D. T. LINDSAY	Fargo
C. B. PORTER	Grand Forks	B. A. MAZUR	Fargo
E. J. BEITHON	Wahpeton	L. B. SILVERMAN	Grand Forks
GALE RICHARDSON	Minot	J. C. SWANSON	Fargo
KEITH FOSTER	Dickinson	G. M. HART	Minot
W. A. WRIGHT	Williston	J. J. MC LEOD	Grand Forks
CHARLES HEILMAN	Fargo	R. D. NIERLING	Jamestown
F. E. ANDERSON	Underwood	O. V. LINDELOW	Bismarck
J. H. MAHONEY	Devils Lake	GORDON E. ELLIS	Williston
J. F. HOUGHTON	Fargo	GEORGE FOSTER	Fargo
O. V. LINDELOW	Bismarck	<i>Committee on Mental Health:</i>	
RALPH MAHOWALD	Grand Forks	JOHN H. YOUNG, Chairman	Jamestown
GEORGE HART	Minot	JOHN FREEMAN	Jamestown
<i>Committee on Rural Health:</i>		LEE CHRISTOFERSON	Fargo
M. S. JACOBSON, Chairman	Elgin	M. J. GEIB	Fargo
A. K. LEWIS	Lisbon	E. G. VINJE	Hazen
CLARENCE MARTIN	Kensal	GEORGE VIGELAND	Rugby
HERBERT WILSON	New Town	H. C. WALKER, JR.	Williston
ROBERT DE LANO	Northwood	L. L. HOOPES	Minot
DOLSON PALMER	Cando	P. R. BERGER	Grand Forks
R. E. HANKINS	Mott	K. M. WAKEFIELD	Cooperstown
<i>Committee on Scientific Program:</i>		M. W. GARRISON	Minot
Appointment expiring 1959		<i>Committee on Geriatrics and Rehabilitation:</i>	
F. A. HILL	Grand Forks	T. H. HARWOOD, Chairman	Grand Forks
P. R. GREGWARE	Bismarck	R. O. SAXVIK	Jamestown
Appointment expiring 1960		PAUL JOHNSON	Bismarck
K. G. FOSTER	Dickinson	M. W. GARRISON	Minot
J. V. MILES, JR.	Jamestown	LEE CHRISTOFERSON	Fargo
Appointment expiring 1961		WILLIAM C. NELSON	Grand Forks
V. J. FISCHER	Minot	H. C. WALKER, JR.	Williston
MARSHALL LANDA	Fargo	KENNETH AMSTUTZ	Minot
SPECIAL COMMITTEES			
<i>Committee on Cancer:</i>		<i>Committee on Foreign Trained Physicians:</i>	
C. M. LUND, Chairman	Williston	C. J. GLASPEL, Chairman	Grafton
G. W. HUNTER	Fargo	JOSEPH SORKNESS	Jamestown
E. J. LARSON	Jamestown	O. W. JOHNSON	Rugby
O. W. JOHNSON	Rugby	W. A. WRIGHT	Williston
T. H. HARWOOD	Grand Forks	D. J. HALLIDAY	Kenmare
GALE RICHARDSON	Minot	<i>Committee on American Medical Education Foundation:</i>	
ROGER BERG	Bismarck	W. E. G. LANCASTER, Chairman	Fargo
NORMAN B. ORDAHL	Dickinson	K. G. VANDERSON	Portland
		D. J. HALLIDAY	Kenmare
		T. H. HARWOOD	Grand Forks
		RALPH DUKART	Dickinson

R. H. WALDSCHMIDT	Bismarck
R. D. NIERLING	Jamestown
JOSEPH CRAVEN	Williston
G. H. HILTS	Cando
G. L. COUNTRYMAN	Grafton
<i>Committee on School Health:</i>	
R. W. MC LEAN, Chairman	Hillsboro
PERCY OWENS	Bismarck
M. H. POINDEXTER	Fargo
G. N. VIGELAND	Rugby
J. P. MERRETT	Valley City
R. E. DORMONT	Minot
J. V. MILES, JR.	Jamestown
W. C. DAILEY	Grand Forks
E. J. SCHWINGHAMER	New Rockford
<i>Committee on Liability Insurance:</i>	
R. H. WALDSCHMIDT, Chairman	Bismarck
JOSEPH SORKNESS	Jamestown
P. H. WOUTAT	Grand Forks
W. E. G. LANCASTER	Fargo
D. J. HALLIDAY	Kenmare
<i>Advisory Committee to Public Assistance Division of the State Welfare Board:</i>	
<i>Representatives:</i>	
E. J. LARSON	Jamestown
E. T. KELLER	Rugby
C. H. PETERS	Bismarck
<i>Liaison Committee to the North Dakota State Bar Association:</i>	
PAUL JOHNSON, Representative	Bismarck
<i>Liaison Committee to the North Dakota Pharmaceutical Association:</i>	
G. A. DODDS, Representative	Fargo
<i>Liaison Committee to the Woman's Auxiliary to the North Dakota State Medical Association:</i>	
A. R. GILSDORF, Chairman	Dickinson
R. W. RODGERS	Dickinson
O. A. SEDLAK	Fargo
R. D. NIERLING	Jamestown
J. C. FAWCETT	Devils Lake
<i>Liaison Committee to the North Dakota State Dental Association:</i>	
DAVID JAEHNING, Representative	Wahpeton
<i>Liaison Committee on Public Information:</i>	
MARLIN JOHNSON, Representative	Bismarck
H. L. REICHERT, Representative	Dickinson
<i>Medical Center Advisory Council:</i>	
P. H. WOUTAT, Member	Grand Forks
<i>Governor's Health Planning Committee:</i>	
P. H. WOUTAT, Member	Grand Forks
<i>State Health Council:</i>	
M. S. JACOBSON, Member	Elgin
R. F. GILLILAND, Member	Dickinson

REFERENCE COMMITTEES

<i>1. To consider reports of President, Secretary, Executive Secretary, and Treasurer:</i>	
WILLIAM R. FOX, Chairman	Rugby
D. R. STRINDEN	Williston
H. A. NORUM	Fargo
JOHN VAN DER LINDE	Jamestown
M. A. K. LOMMEN	Bismarck
<i>2. To consider reports of Council, Councillors, and Special Committees:</i>	
R. B. TUDOR, Chairman	Bismarck
R. F. GILLILAND	Dickinson
ELMER BEITHON	Wahpeton
G. L. COUNTRYMAN	Grafton
D. W. PALMER	Cando
<i>3. To consider reports of Delegate to the A.M.A., Medical Center Advisory Council, and Committee on Medical Education:</i>	
KEITH FOSTER, Chairman	Dickinson
L. G. PRAY	Fargo
R. W. MC LEAN	Hillsboro
M. W. GARRISON	Minot
<i>4. To consider reports of Standing Committees, except Committees on Medical Economics, Medical Education, and Advisory Committee to Public Assistance of State Welfare Board:</i>	
CARL BAUMGARTNER, Chairman	Bismarck
A. F. HAMMARGREN	Harvey
WELDE W. FREY	Drayton
NEIL A. MAC DONALD	Valley City
F. R. ERENFELD	Minot

<i>5. To consider reports of the Committee on Medical Economics, including the Committee on Veterans Medical Service, Advisory Committee to Public Assistance Division of State Welfare Board, and Committee on Rural Health:</i>	
ARTHUR BURT, Chairman	Fargo
E. A. HAUNZ	Grand Forks
V. J. FISCHER	Minot
EDMUND VINJE	Hazen
F. M. MELTON	Fargo
<i>6. Committee on Resolutions, to include New Business:</i>	
F. D. NAEGELI, Chairman	Minot
F. A. DE CESARE	Fargo
MILTON NUGENT	Bismarck
R. E. MAHOWALD	Grand Forks
J. N. ELSWORTH	Jamestown
<i>7. Committee on Credentials:</i>	
R. B. TUDOR, Chairman	Bismarck
(also serves as Chairman on Committee No. 2)	
F. M. MELTON, Co-chairman	Fargo
(also serves on Committee No. 5)	

PROCEEDINGS

Of the House of Delegates Of the North Dakota State Medical Association Seventy-Second Annual Meeting

The first session of the House of Delegates of the North Dakota State Medical Association was called to order by the Speaker of the House, Dr. G. A. Dodds, at 4:00 P.M. in the Prince Hotel, Bismarck, May 2, 1959.

Dr. Tudor, chairman of the Credentials Committee, reported that there was a quorum present and that all credentials were in order.

Secretary Nierling called the roll. The following delegates and alternates were present:

Drs. Arthur C. Burt, Fargo; Elmer Beithon, Wahpeton; F. M. Melton, Fargo; F. A. DeCesare, Fargo; L. G. Pray, Fargo; H. A. Norum, alternate, Fargo; William R. Fox, Rugby; D. W. Palmer, alternate, Cando; E. A. Haunz, alternate, Grand Forks; G. L. Countryman, Grafton; R. E. Mahowald, Grand Forks; Welde W. Frey, alternate, Drayton; F. D. Naegeli, Minot; F. R. Erenfeld, alternate, Minot; A. F. Hammargren, Harvey; V. J. Fischer, Minot; M. W. Garrison, Minot; Neil MacDonald, Valley City; M. A. K. Lommen, Bismarck; Milton Nugent, Bismarck; Robert Tudor, Bismarck; Carl Baumgartner, Bismarck; Edmund Vinje, Hazen; J. N. Elsworth, Jamestown; J. M. Van der Linde, Jamestown; D. R. Strinden, Williston; R. F. Gilliland, Dickinson; Keith Foster, Dickinson; and R. W. McLean, Hillsboro.

There were 24 delegates and 5 alternate delegates present.

The following also attended the meeting of the House of Delegates:

Drs. R. W. Rodgers, L. W. Larson, R. H. Waldschmidt, J. C. Fawcett, A. R. Gilsdorf, J. D. Craven, G. W. Toomey, V. G. Borland, N. A. Youngs, C. H. Peters, D. J. Halliday, K. G. Vandergon, C. M. Lund, O. A. Sedlak, E. J. Larson, E. H. Boerth, and R. D. Nierling.

The motion was made, seconded, and passed that the reading of the minutes be dispensed with and that they be accepted as printed in THE JOURNAL-LANCET.

Motion was made, seconded, and passed that the reading of the reports of the President, Secretary, Executive Secretary, and Treasurer be dispensed with and that they be referred to the proper reference committee, No. 1.

REPORT OF THE PRESIDENT

Once more the events of the past twelve months are to be recorded in the annals of history. Many things have been accomplished this past year, and, likewise, many old problems together with some new ones will be handed to our incoming president.

I was very pleased to have been invited to attend all the district society meetings. However, I regret very much that conflicting engagements made it impossible for me to attend all of them. The meetings I did attend showed me that the members of the component societies are really beginning to take an active interest in medical

affairs. There still, however, is a lot of misunderstanding regarding the problems confronting the medical profession today, and, likewise, there is even a greater misunderstanding regarding the means by which some of these problems are to be solved. I, too, had the good fortune to attend the A.M.A. Public Relations meeting in Chicago with Lyle Limond and Dr. John Cartwright, the state chairman on Public Relations. I felt the same as did Dr. Rodgers the year before when he stated that he was sorry that more doctors could not attend this meeting. It is exceedingly important that the public become aware of the problems facing medicine and also be informed as to how these problems are being solved.

I had a chance to attend meetings of various committees. These will be reported in detail under their respective titles in the Handbook. I would like to take a few minutes to recapitulate the work done by the Economics Committee under the able direction of Dr. C. H. Peters. Early in the fall, this committee met and agreed to aid in any way possible to prevent the overutilization of prepaid medical care. They also reviewed the proposed relative value fee schedule and favored its adoption. With this accomplished, they met and negotiated with the Indian Bureau, the Workmen's Compensation Bureau, and the Welfare Bureau. Some of these negotiations have not been completed, but one can already see how much easier it will be to meet with the various agencies and merely have to agree to a conversion factor instead of several hundred individual items. I feel that the Economics Committee should be congratulated for this accomplishment and if it needs ratification by the House of Delegates, I hope it will be forthcoming without a lot of restricting amendments.

The winter months sped by rapidly while the legislature was in session. Again, credit must be given to the excellent work done by the Legislative Committee and by our lobbyist, Mr. Lyle Limond. This was my first real contact with members of the North Dakota House and Senate and I must say that all of the members I talked to were very anxious to hear our presentations, and, from the report of the committee, it is to be noted that, in most instances, the final outcome of the various bills was favorable. This year there were some 50 measures pertaining to some aspects of medicine or medical care. I predict that in two years from now this number will be even larger. While it is true that the legislature will not meet again until 1961, I hope the Legislative Committee will remain strong and active, for many important bills will undoubtedly be coming up in Congress during 1959.

At the A.M.A. interim meeting in Minneapolis this fall, our society in conjunction with the other societies forming the North Central Conference participated as hosts in the hospitality room. Even though this room was off in a corner, it became so well known that members from all states in the Union soon beat a track to this rendezvous.

The Blue Shield has had another very favorable year. The cooperation of the physicians throughout the state has been excellent. There seems to be a better understanding regarding the principles of Blue Shield. Much credit should be given to Donald Eagles and his story of the Phililoo Bird.

The Blue Shield Board has adopted the relative value fee schedule, and I am sure that when once fully in operation, it will greatly simplify the whole operation of processing claims. I attended the Blue Shield Public Relations meeting in Chicago in March. It so happened that there were other meetings in Chicago at the same time, which made it possible for some 6 doctors from North Dakota to attend this meeting. At this meeting,

Blue Shield's approach to the problem of care for the aged was presented. North Dakota was proud to be able to report that we already had been accepting people beyond the age of 65 at regular rates and giving them full benefits. I am sure that programs of this type will do much to forestall legislation of the Forand type.

The Cancer Society, under the leadership of Dr. C. M. Lund, has launched on a new program which gives the district societies the privilege of selecting their own speakers and the expenses are paid for by the Cancer Society. Several societies availed themselves of this new type of program. The Cancer Caravan again traveled across the western and southwestern part of North Dakota. The Cancer Society should be congratulated on the splendid educational program they are rendering the physicians of this state.

At the time of the A.M.A. meeting, Dr. Myers, editor of THE JOURNAL-LANCET, invited all interested doctors to a breakfast, at which time future plans for the publications were discussed. Fruits of this meeting are beginning to show in the articles now being prepared and published in the Journal.

I have reported to you the activities of only a few members. There are, however, many more who deserve equal attention, who in their modest, quiet way have kept our society running smoothly. To these unsung heroes, I want to extend my heartfelt thanks. They are the ones who make light work out of my office as president. I wish also to express my most sincere appreciation and thanks to Mr. Lyle Limond. He was always where I wanted him with the required information at the proper time. His devotion to the welfare of organized medicine and to our state organization is deeply appreciated. It has been a privilege and an honor to represent you at various state and national meetings, and I am deeply grateful for this opportunity. If I have been able to serve you in some small way, I am happy indeed.

O. A. SEDLAK, M.D., President

REPORT OF THE SECRETARY

MEMBERSHIP: The total membership for 1958 was 433. Of this number, 403 paid the regular membership fee, 9 were on a retired or limited basis, and 16 were honorary members. Five members were carried on a complimentary basis due to military service and age. Three members passed away during the year, and several have left the state. New members, however, are being steadily added to our roster.

Table 1 shows the annual membership for the past five years.

TABLE 1
COMPARISON OF ANNUAL MEMBERSHIP

	1954	1955	1956	1957	1958
Paid memberships	378	387	380	395	403
Honorary memberships	15	14	16	18	16
Retired and limited	12	12	12	9	9
Dues cancelled, military service and age exemption	6	3	8	6	5
Total	411	416	416	428	433

Table 2 shows the annual dues for 1959, which have been coming in very slowly. There is still a very large number of members who have not as yet paid their 1959 dues, and the district medical society secretaries and councillors are urged to use every possible means to collect the dues of these delinquent members.

TABLE 2

	April 8 1955	April 19 1956	May 1 1957	April 15 1958	April 15 1959
Paid-up members	323	334	328	313	309
Honorary members	14	16	18	16	20
To be honorary	3	6	2	3	4
Dues cancelled, military service	3	5	5	3	3
Limited	1	1			1
Retired	7	6	7	3	1
Total	351	368	360	338	338

STATE ASSOCIATION MEMBERSHIPS

1958:	Regular	Retired	Limited	Comp.	Honorary
First	90				2
Second	29				2
Third	68			2	3
Fourth	64		1	2	3
Fifth	8				1
Sixth	65	3	2		4
Seventh	29	1			1
Eighth	18				
Ninth	24	2			
Tenth	8			1	
Total	403	6	3	5	16

1959:	Regular	Retired	Limited	Comp.	Honorary
First	84			1	1
Second	23				2
Third	54			1	4
Fourth	32				5
Fifth	6				1
Sixth	48		1		6
Seventh	33	1			2
Eighth					
Ninth	21				3
Tenth	8			1	
Total	309	1	1	3	24

A.M.A. GENERAL MEMBERSHIPS

	1958	1959
First	89	84
Second	31	25
Third	72	59
Fourth	71	37
Fifth	9	6
Sixth	72	54
Seventh	34	37
Eighth	18	
Ninth	25	21
Tenth	9	8
Total	430	331

It is, of course, the wish of the association that all doctors practicing in North Dakota be members of our group. This, of course, has not been true in the past and probably will never be entirely true, but, nevertheless, it behooves each of us to attempt to have our fellow physicians join and take an active part in the association.

The dues this year have been coming in at approximately the same rate as previously. The state office always appreciates the fact that the secretaries of the component medical societies see that the dues are collected as early as possible, especially by March 1, as at that time information for the Handbook for the annual meeting is assembled. We do appreciate the early payment of dues and would like to have as many as possible sent in soon after the first of the year.

R. D. NIERLING, M.D., Secretary

REPORT OF THE EXECUTIVE SECRETARY

GENERAL COMMENTS: Your executive secretary attended several state, regional, and national meetings in behalf of the association.

The routine of the headquarters office continued at an increased tempo this past year because of an increase in the areas of medical economics, medicare, legislative matters, and general services to the members.

The affairs of your state office remain in the capable hands of Mrs. G. K. Frenming, office secretary.

LEGISLATION: Your executive secretary was involved in his fourth legislative session since coming to North Dakota.

Your association was interested in 50 bills this past session. The Legislative Assembly showed an increased interest in the areas of geriatrics, mental health, and education.

We had our greatest cooperation on the part of the members of the association during the past session. My sincere thanks go to all of the members who visited the legislature, wrote letters, sent wires, or made phone calls to their representatives and senators.

A complete breakdown as to the bills we were interested in is to be found in the report of O. W. Johnson, M.D., chairman, Committee on Legislation.

On the national scene, we find bills identical to the Forand type of legislation of last session being introduced in both the Senate and the House.

The Keogh Bill, which provides that the self-employed could defer taxes on as much as 10 per cent of adjusted gross income up to \$2,500 a year provided the money is placed in retirement plans, has passed the House.

PHYSICIANS' PLACEMENT SERVICE: Thirty-one North Dakota communities and 11 physicians or groups are on file in this office in regard to a request for a physician and/or additional physicians.

The 31 communities are as follows: Anamoose, Ashley, Belfield, Buffalo, Cooperstown, Edmore, Enderlin, Esmond, Finley, Flasher, Fordville, Glen Ullin, Grenora, Hankinson, Harvey, Hatton, Killdeer, Larimore, McClusky, McHenry, Mandan, Medina, Milnor, New England, Page, Pembina, Rutland, Sharon, Strasburg, Walhalla, and Watford City.

U.N.D. MEDICAL SCHOOL SCHOLARSHIPS: The 1958 winners of the association's scholarship prizes, totaling \$500, offered at the School of Medicine were as follows: anatomy, first year, Jules Fuglestad and George Dixon (equal); physiology and pharmacology, Rollin Pederson; microbiology, Raymond J. Parisi; pathology, second year, Edwin G. Rice and Raymond J. Parisi (equal); and highest average, first year, Jules Fuglestad.

FINANCE: The treasurer's report continues to show an improved balance. The goal of having one year's operating budget in reserve is being maintained as it should be in the interests of good business practice.

Receipt of dues continued to be slow as in years past, as will be noted in the following listing:

District society	Number of unpaid members
First	3
Second (Devils Lake)	5
Third (Grand Forks)	15
Fourth (Northwest)	31
Fifth (Sheyenne Valley)	1
Sixth	11
Seventh (Stutsman)	2
Eighth (Kotana)	18
Ninth (Southwestern)	4
Tenth (Traill-Steele)	2
	92

MEDICARE: The Dependents' Medical Care Program (Medicare) commenced on December 7, 1956. Up to April 1, 1959, 1,791 claims had been processed by this office.

The total sum paid to North Dakota physicians as of April 1, 1959, amounted to \$121,048.

Each claim for services rendered averages roughly \$67.59.

THOUGHTS FOR THE FUTURE:

1. Greater interest should be given and more definite action should be taken by the association in the problems of our aging population.

2. Continuing interest should be shown in the area of mental health.

3. Interest should remain high in the field of medical economics.

4. Continued support should be given the State Health Department with efforts made to secure a doctor of medicine as director of the department.

5. Serious thought should now be given to plans for the association's diamond anniversary meeting scheduled for Bismarck in 1962.

ACKNOWLEDGMENTS: Your executive secretary wishes to express his sincere appreciation to our president, Dr. O. A. Sedlak, for his efforts in behalf of this association. Dr. Sedlak was ever willing to leave his busy practice to attend district society meetings and other meetings of importance to the association.

My sincere thanks also go to Dr. C. H. Peters, chairman, Committee on Medical Economics; Dr. O. W. Johnson, chairman, Committee on Legislation; and members of said committees for the fine work done. Thanks are also due those other members with whom this writer has had occasion to work this past year in the association's several programs.

LYLE A. LIMOND, Executive Secretary

REPORT OF THE CHAIRMAN OF THE COUNCIL

The Council of the North Dakota State Medical Association had its regular spring meetings May 3 and 4 at the Hotel Clarence Parker, Minot. The interim meeting was held November 30, 1958, at the Curtis Hotel, Minneapolis.

All of the district councillors were present at the council meeting held in May at 1:00 P.M. at the Hotel Clarence Parker. In addition to our president, Dr. R. W. Rodgers, 8 other officers of the state association, and our executive secretary were present.

Mr. James Dixon submitted a plan of malpractice insurance to the council for the North Dakota doctors. After this was discussed in length, motion was made and passed that Mr. Dixon be allowed to take a survey of the doctors of the state to determine their interest but, be-

fore taking any further action, that he report back to the council for approval.

The possibility was discussed that Dr. L. W. Larson of Bismarck, the present chairman of the Board of Trustees of the American Medical Association, might be actively considered as a candidate for president-elect of the A.M.A. either in 1959 or 1960. It was moved and seconded that \$3,000 be budgeted for the purpose of enhancing Dr. Larson's candidacy for this office, particularly to be expended in conducting a "hospitality room." Drs. R. H. Waldschmidt and C. H. Peters of Bismarck were appointed to keep the council in contact with this situation and to let it know if it could be of further service to Dr. Larson. The council went on record as giving all possible support to Dr. Larson's candidacy to this office. It was moved and seconded that the interim council meeting be held in Minneapolis, November 30, 1958, in order to coincide with the American Medical Association clinical meeting. At this time, we could also assist Dr. Larson by showing the members of the A.M.A. that North Dakota was interested in the administration of the A.M.A. and to show that we were backing our member. It was moved and seconded that the executive secretary's salary be set to \$9,000 per year plus \$100 per month for the Medicare program as long as the administrative course warranted its expenditure. The terms of this agreement are to run for three consecutive years. It was also moved and seconded that \$1,600 that accumulated in the Medicare account up to May 1, 1958, in North Dakota be appropriated to Mr. Limond for his work on this project.

A motion was made and seconded that the executive secretary send a check for \$500 to the president of the state association for his expenditures for the year.

It was moved and seconded that Mr. Limond be given the authority to burn the defective copies of the book *Medical Milestones*, with the exception of the few copies retained for the committee to work with. The book *Medical Milestones* is still being processed under the supervision of Dr. James Halliday.

The second session of the council was held on May 4, 1958, at the Clarence Parker Hotel. All councillors were present plus 6 other officers of the state association and our executive secretary. It was moved and seconded that the original action of the council denying the request for exhibit space by chiroprodists be confirmed. Councillors were urged to read the duties of the councillors as outlined in the Constitution and Bylaws, and it was urged that a format of material to be included in the councillors' reports be made accessible to each councillor.

Two members of the council, Dr. Keith Vandergon and Dr. J. D. Craven, were appointed to act on the Board of Directors of Blue Shield to represent the state medical association.

Election of officers of the council was held, and the following physicians were appointed: chairman, A. R. Gilsdorf; vice-chairman, V. G. Borland; and secretary, C. H. Peters.

The interim meeting of the council of the state medical association was held November 30, 1958, at the Curtis Hotel, Minneapolis. Eight councillors were present plus 5 other officers of the association.

The budget for 1959 was discussed and each item approved by the council.

There was a general discussion regarding the Medicare program in North Dakota and it was generally felt that the North Dakota plan was working well. In only 2 cases were charges made by the M.D.'s which did not conform to the usual fees charged in North Dakota. Both of these claims were sent back to the doctors involved

and corrected voluntarily without the necessity of a meeting of the Mediation Committee.

Mr. Ed Boerth of "Insurance Incorporated" in Fargo was next introduced to report on the recent survey of the physicians in North Dakota for malpractice insurance group coverage. The general summary of the facts concerning the over-all picture of the insurance program followed. Mr. Boerth felt confident of the success of his proposed plan. He requested approval from the council to proceed further toward acquainting members of the North Dakota State Medical Association with details of the plan. Motion was made and carried that Mr. Boerth be given permission to further contact the members of the association. A great deal of work was done on this schedule by Dr. C. H. Peters of Bismarck, chairman of the committee.

At a meeting of the Committee on Medical Economics on September 3, 1958, the stamp of approval was given to the proposed North Dakota relative value fee schedule. The schedule was published in October of 1958 and mailed to all the members of the North Dakota State Medical Association. The first step taken by the committee was a request to the California Medical Association for copies of their fee schedule, which was granted. Letters and copies of this schedule were sent to all special societies, with the request that the various officers of such societies review the schedule and submit any desired changes.

The negotiating team of the Medical Economics Committee, Drs. V. G. Borland, E. J. Larson, J. H. Mahoney, V. J. Fischer, and C. H. Peters and Mr. Lyle Limond, have met or expect to meet with the Public Welfare Board, the Division of Vocational Rehabilitation, the Veterans Administration, the Workmen's Compensation Bureau, and the Indian Bureau regarding their acceptance of a new relative value schedule.

On November 19, 1958, the negotiating team met with the Public Welfare Board, at which time Dr. C. H. Peters presented a brief concerning the schedule. Conversion factors of \$2.75 for medicine, \$3.20 for surgery, and \$5.00 for x-ray and laboratory were discussed. No action was taken, and it was tabled by the Public Welfare Board for further study.

Conversion factors of \$4.00 for medicine, \$4.50 for surgery, and \$5.00 for x-ray and laboratory were suggested to the Workmen's Compensation Bureau. They felt these conversion factors were fair and will give their answer at a later date.

At a meeting with the Division of Vocational Rehabilitation, that organization decided that the usual private fees charged by physicians would probably be acceptable. Further confirmation is desired.

At a meeting with the Veterans Administration on November 29, the matter was tabled and taken under advisement. It was suggested by the Medical Economics Committee that the VA pick out 50 items of common usage and set up a schedule for them. These items would then be negotiated.

It is hoped by the Medical Economics Committee that state agencies will adopt the relative value fee schedule, which is planned to save time and money for all concerned. There will undoubtedly be conversion factors for each agency, but, after several meetings with each of these agencies, it is hoped that a satisfactory conclusion with each may be reached.

A lengthy discussion followed regarding Blue Shield, and it appears imperative that the Committee on Medical Economics cooperate fully with it, and the council hoped that Blue Shield would ask the Medical Economics Committee to sit in on a meeting with them on a

fully cooperative basis. It appeared desirable at this time for the Medical Economics Committee to cooperate with the other state agencies, set up a schedule and put it in good working condition, and then present the results to Blue Shield.

There was a discussion regarding the abuse of hospitalization insurance and how to solve the problem. A program of informational material is to be distributed to the public. A motion was made and passed to accept the full report presented by Dr. C. H. Peters on the relative fee schedule and the remarks on abuse of hospitalization insurance. The council commended the excellent work of Dr. Peters and the entire Medical Economics Committee.

A résumé followed concerning the report of the Mental Health Committee, of which Dr. John Young is chairman. The council was asked to vote "yes" or "no" on the resolutions included in this report.

Resolution 1. It was moved and seconded that this committee recommend to the state medical association that it support and actively endorse the establishment and building of a Children's Psychiatric Unit.

It was moved that the council realize the need for psychiatric care for children in North Dakota. The details would be worked out later when more information will be available. Motion was seconded and carried.

Resolution 2. It was moved, seconded, and adopted that it be recommended to the North Dakota State Medical Association that, in order for the State Hospital to continue its efficient services, study be given to the problem of developing decentralized facilities for the care of geriatric patients not needing specialized psychiatric aid but not acceptable to the usual nursing home facility.

Motion was made that the resolution be approved and that the council recognize such a need. Motion was seconded and carried.

Resolution 3. It was moved, seconded, and adopted that it be recommended to the North Dakota State Medical Association that provisions be designated in each hospital for safe care of the emotionally disturbed patient.

Motion was made that this resolution be approved by the council. Motion was seconded and carried.

Resolution 4. It was then moved, seconded, and adopted that this committee offer its services in an advisory capacity to the North Dakota Mental Health Association. It was then amended to include that this committee encourage the North Dakota Mental Health Association to consider sponsoring a program of education of psychiatric principles for the physician as one of their projects.

Motion was made that the resolution be adopted. Motion was seconded and carried.

Resolution 5. It was moved, seconded, and adopted that this committee would be happy to offer its services in an advisory capacity to the Commission on Alcoholism.

Motion was made that this resolution be approved. Motion was seconded and carried.

On June 26, 1958, the House of Delegates of the American Medical Association, which met in annual session at San Francisco, reported on a resolution which provides: "1. That the House of Delegates reiterates its commendation and approval of the principle of voluntary health agencies. 2. That it is the firm belief of the American Medical Association that these agencies should be free to conduct their own programs of research, public and professional education, and fund raising in their particular spheres of interest. 3. That the House of Delegates respectfully requests that the American Medical Research Foundation take no action which would endanger the constructive activities of the national voluntary

health agencies. 4. That the Board of Trustees actively continue its studies of these perplexing problems, looking forward to their ultimate solution."

Inasmuch as the foregoing follows the association's belief that the patient should have the freedom to select his own physician and is closely associated, it was asked that the council approve the stand of the A.M.A. It was moved and seconded that the council go on record as approving the principle of the resolution as suggested by the A.M.A.

It was the consensus of the council that honorary membership be given to all physicians who have practiced medicine in North Dakota for fifty years, whether at present members or never members. A motion was made and carried that a luncheon be held each year to honor all new and old honorary members.

A motion was made and seconded that the council go on record as disapproving any type of Forand legislation.

Mr. Limond next presented a request from Dr. Robert Story, president of the North Dakota Heart Association, that the council approve the appointment of an advisory committee of the association to advise and assist the North Dakota Heart Association. It was moved and carried that such an advisory committee be appointed.

A motion was made and carried that the delegate to the A.M.A. present the name of L. W. Larson, M.D., in nomination as president-elect of the American Medical Association House of Delegates at the meeting of the A.M.A. in 1960.

Motion was made and carried that the executive secretary be instructed by the council to explore with the executive vice-president of the Blue Shield a public relations program to be brought before the board of Blue Shield and to the council.

It was suggested that the executive secretary poll the membership as to the names of the personal physicians of the various North Dakota senators and representatives. It was thought possible that individual doctors, as well as members of the council, could spend at least a day or two in Bismarck during the legislative session contacting the various legislators, particularly those they are associated with through the practice of medicine.

Dr. O. A. Sedlak, president of the North Dakota State Medical Association, addressed the council very briefly, thanking them for their cooperation.

A. R. GILSDORF, M.D.,
Chairman of the Council

REPORTS OF COUNCILLORS

First District

The First District Medical Society held 7 meetings during the fiscal year from March 1958 to February 1959. No meetings are ordinarily scheduled for the months of May, June, July, and August. The November meeting was cancelled because of severe weather conditions. The meetings are held in the Town Hall of the Gardner Hotel, Fargo, on the fourth Tuesday of the month.

In March, members of the District Dental Society were invited as guests for this special cancer meeting. Dr. Stuart W. Arhelger, surgeon at the University of Minnesota and director of the Tumor Clinic, gave a paper on "Cancers of the Mouth." This paper was well received by both dentists and physicians, and a lively discussion followed. Dr. W. E. G. Lancaster, chairman of the Committee for the American Medical Education Foundation, urged members to donate to this fund. The possibility of establishing a poison control center in this

district was discussed. Mr. Knantz, of the Fargo Nursing Home, gave a brief report on the purposes and operation of the new nursing home in Fargo.

At the April meeting, Dr. William McConahey, consultant in Internal Medicine at the Mayo Clinic, gave an excellent paper on "Recent Advances in Endocrinology." Dr. Oliver Sedlak, chairman of the special nominating committee for corporation members of Blue Shield, gave a report. The 16 representatives of the Blue Shield Corporation to represent the First District Medical Society were duly nominated and elected.

At the September meeting, Dr. A. B. Baker, professor of neurology at the University of Minnesota, presented a fine paper on "Cerebral Vascular Diseases." A letter from Mrs. B. A. Mazur, president of the First District's Woman's Auxiliary, was read requesting that the society grant the Auxiliary \$100 to cover the costs of an essay contest. A motion was made, seconded, and passed to grant this request. Discussion of the poison control center in Fargo was initiated by Dr. Mazur, chairman of the Public Health Committee. A motion was made, seconded, and passed that interns in the area be invited to be guests at our county medical society meetings. A motion to continue the annual diabetic drive in the area was defeated. Mr. George Anderson discussed the United Fund problems in Fargo and stressed the importance of generous support on the part of the physicians.

The guest speaker at the October meeting was Dr. John Anderson, professor of pediatrics at the University of Minnesota, who presented a paper on "Liver Disease in Infants."

The December meeting was devoted to local matters, and no guest speaker was present. Dr. Oliver Sedlak, president of the state medical society, presented a report on "The Problems of Medicine on the State Level." Dr. V. G. Borland gave a report on the fall activities of the Medical Economics Committee. Dr. L. G. Pray, president of the First District Medical Society, appointed an interim committee on legal fees for testimony and legal consultation. Members of this committee are: Drs. D. T. Lindsay, M. B. Gustafson, and D. L. Olson. The following officers were elected for the coming year: president, Dr. A. L. Klein; vice-president, Dr. R. G. Rogers; and secretary-treasurer, Dr. Frank M. Melton. Dr. G. Wilson Hunter was elected to a term on the Board of Censors, his term to expire in 1961. Dr. E. M. Haugrud and Dr. B. A. Mazur were the other two members of the Board of Censors, their terms expiring respectively in 1960 and 1959. The delegates to the state medical meeting in May were elected as follows: Drs. A. C. Burt, E. J. Beithon, F. M. Melton, W. L. Macaulay, F. A. De-Cesare, and L. G. Pray. The alternates were: Drs. H. A. Norum, D. G. Jaehning, J. F. Houghton, L. E. Wold, R. J. Zauner, and J. F. Schneider.

The first meeting in 1959 was held on January 27. Dr. Richard L. Varco, professor of surgery at the University of Minnesota, gave an excellent presentation on "Surgery for Acquired Heart Disease." It was decided to give over the April meeting to the annual Long-Darrow lectureship, at which time Dr. George Herman will be the speaker. Following considerable discussion, the First District Medical Society approved and endorsed the establishment of a blood bank in this area by the Southwest Blood Bank, Inc. Representatives from this institution were present at this meeting and pointed out the advantages of such a move. The directorship of the blood bank is to be rotated between the pathologists in Fargo beginning January 1 of each year. Dr. John LeMar was appointed director for the first year. Mr. Donald Eagles discussed the new proposed Blue Shield Plan C.

At the February meeting, Dr. Young of the State Mental Hospital at Jamestown gave a nice presentation on "The Best Usage of Tranquillizing Drugs in Office Practice." Prior to the guest speaker's paper, a lively discussion of considerable length was held between the various members regarding welfare fees. Many aspects of this problem were brought out in the discussion. The consensus was that these matters are best left to the Medical Economics Committee rather than to take action on a local level. Many members expressed a feeling that the First District Medical Society should devote 2 meetings a year to business matters and forego the practice of asking an outside speaker to these meetings.

Membership of the district: Active members, 89; retired members, 2; honorary members, 0; limited members, 6; service members, 1; new members, 6; member transferred, Dr. Fred Behling to California; deceased members, Dr. Nils Tronnes and Dr. H. B. Huntley; and nonmembers residing and practicing in each councillor district, none so far as is known.

V. G. BORLAND, M.D., Councillor

Second District

The Devils Lake District Medical Society held 8 regular meetings in the past year, all of which were well attended. All physicians practicing in the area are members of the society. There is 1 new member, Dr. Henry Krahn of Edmore.

The following officers were elected at the January 8 meeting: president, Dr. William Gorrie, Maddock; vice-president, Dr. R. Donald McBane, Devils Lake; and secretary-treasurer, Dr. L. F. Pine, Devils Lake. Delegates: Dr. William Fox, Rugby; and Dr. R. M. Fawcett, Devils Lake. Alternate delegates: Dr. D. W. Palmer, Cando; and Dr. J. H. Mahoney, Devils Lake. Censor: Dr. Thomas Longmire, Devils Lake.

At each meeting, the scientific program was presented by an out of town speaker, including the following:

Dr. G. M. Hart, orthopedic surgeon, Northwest Clinic. Topic: "Fractures."

Dr. L. Shook, Fargo Clinic. Topic: "Pediatric Roentgenology."

Dr. C. B. Darner, Fargo Clinic. Topic: "Endometriosis."

Dr. M. Poindexter, Fargo Clinic. Topic: "Staphylococcal Infections in Hospitals."

Dr. J. N. Kiely, Mayo Clinic. Topic: "Chemotherapy of Malignant Diseases."

Dr. John Young, outpatient department, State Hospital. Topic: "Psychiatry and Various Diagnostic Aspects."

Dr. A. Cuadrado, North Dakota Tuberculosis Sanatorium. Dr. Cuadrado spoke about endeavoring to uncover the rampant type of tuberculosis, particularly in regard to usage of the Mantoux test with PPD.

Many of the usual problems came up at the business sessions of the meetings, one of the most prominent being the changes in the Blue Cross and Blue Shield. They were quite well clarified at the January meeting when Mr. Don Eagles and the state president, Dr. O. A. Sedlak, visited our society. After the presentation by these men, an old motion of the society was rescinded and a new motion passed approving the adoption of Plan C. The society went on record as being in favor of the state plan of malpractice insurance. However, individual members have been waiting to see what the majority of the state decided upon. It was felt there should be more leadership by some of the larger groups in the state.

At the January meeting, we were also visited by Mr. Lyle Limond, who reminded us to be on our toes and

contact our legislators and have them send us copies of all bills relating to medical and welfare legislation.

At the request of the Devils Lake Medical Auxiliary, the society participated in the AAPS essay contest. Prizes of \$25, \$15, and \$10 were allocated. The response was only fair.

It is regrettable that one of the members was forced to bring up a personal problem of unethical remarks on the part of other members of the profession in regard to consultation leading to law suits. In the discussion which ensued, Dr. John Fawcett recommended bringing any specific problems that arise to the district society and, after all specific data are collected, presenting the data to the Board of Censors of the state medical association, which, in turn, can present the problem to the Board of Examiners, if it should go that far.

The Devils Lake District Society unanimously approved a plan to hold a special meeting in May after the state meeting. The purpose of this meeting is to obtain a report from the delegates to the state meeting at an early date while it is still fresh in their minds. In the past, delegates have not reported until the September meeting, and sometimes the report has been disregarded entirely.

G. W. TOOMEY, M.D., Councillor

Third District

During 1958, the Grand Forks District Medical Society held 7 meetings, and a résumé of each follows.

The first meeting of the year was held January 15, 1958, at the Riviera Oriental Room with 32 members in attendance. No scientific meeting was held because of election of officers.

Our next meeting was held February 19, 1958, in the Riviera Oriental Room with 37 members in attendance. Our guest speaker was Dr. Brooks Ranney, who spoke on "Induction of Labor."

Our third meeting was held March 19, 1958, in the Riviera Oriental Room with 34 members in attendance. Dr. Lloyd S. Ralston and a number of other physicians spoke on "The Annual Health Examination." Don Eagles discussed the Blue Shield insurance program. At the business meeting following, a Poison Committee was formed.

On March 26, 1958, the Cancer Caravan meeting was held in the city armory. It was very well attended. Dr. Stuart Arhelger was the guest speaker, and his topic was "Cancer of the Oral Cavity." At this meeting, medical students and dentists were also present.

Our next meeting was held April 16, 1958, in the Riviera Oriental Room with 31 members in attendance. Our guest speaker was Dr. Donn G. Mosser, who spoke on "The Recent Techniques of Radiation Therapy." Dr. R. W. Rodgers also made some comments at this meeting.

On September 17, 1958, we held our meeting in the Deaconess Hospital at Grafton. Thirty-one members attended. Dr. W. L. Macaulay, our guest speaker, spoke on "Diagnostic Quizzes on Dermatology."

Our next meeting was held on November 5, 1958, in the Riviera Oriental Room with 41 members in attendance. Our guest speaker was Dr. Cushman D. Haagen, who spoke on "Present Day Concepts in the Treatment of Carcinoma of the Breast." At our business meeting following the program, a Cytology Committee and a Public Education Program were formed.

Our last meeting was held December 17, 1958, in the Riviera Oriental Room with 32 members in attendance. Dr. J. H. Young spoke on "Psychiatry and General Practice." Don Eagles also spoke regarding Plan C of Blue Shield.

On January 21, 1959, the following members were elected to office: president, Dr. L. J. Prochaska; vice-president, Dr. Welde W. Frey; and secretary-treasurer, Dr. J. J. McLeod, Jr. Delegates: Dr. Frank A. Hill, Dr. W. C. Dailey, Dr. G. L. Countryman, Dr. R. E. Mahowald, and Dr. R. C. Painter. Alternate delegates: Dr. J. A. Sandmeyer, Dr. W. P. Teevens, Dr. Robert H. DeLano, Dr. John H. Graham, and Dr. Welde W. Frey. Board of Censors: Dr. W. H. Witherstine, 3 years; Dr. R. E. Leigh, 2 years; and Dr. E. L. Grinnell, 1 year.

There are 73 active members, 3 retiring members, and 2 honorary members in this district society. There were 11 new members added during the year, and 4 of our members left the state during this period. Dr. John G. Arneberg, who retired a number of years ago, died in December 1958. Drs. Mervin Rosenberg and Raymond L. Coultrip reside and practice in our district but are not members of the Grand Forks District Society.

NELSON A. YOUNGS, M.D., Councillor

Fourth District

Seven meetings were held by the Fourth District Medical Society during 1958, and the State Medical Association was entertained at Minot May 3 to 6.

The first meeting was held January 17 at the Riverside Lodge, and 29 members and 2 guests were present. The annual election of officers was held. Dr. Greene of Rochester spoke on "Asymptomatic Microhematuria."

February 27, at the Capri Lounge, Dr. James Mason, of the Mayo Clinic, spoke on "Surgery of the Head and Neck." Dr. O. A. Sedlak and Mr. Don Eagles, of Fargo, reviewed the Blue Shield program.

March 28, a joint meeting of the doctors and dentists was held at the Minot Country Club. Some 60 men were present, and heard Dr. Stuart Arhelger, surgeon from the University of Minnesota, speak on "Malignant Tumors of the Oral Cavity."

April 24, at the Minot Country Club, 38 members and 2 guests were present to hear Dr. R. R. Best, of Omaha, give a paper on "Bile Duct and Gallbladder Problems."

September 25, at the Minot Country Club, Dr. F. W. Hoffbauer, of the University of Minnesota, addressed the group on "Jaundice as a Complication of Certain Medications." At this meeting, steps were taken to establish a Poison Control Center at St. Joseph's Hospital.

October 16, at the Minot Country Club, the speaker was Mr. Quinn Jordon, of Southwest Blood Banks, Inc. He described in detail the services of his organization which are available to doctors of the area.

November 20, at the Minot Country Club, Dr. A. R. Cuadrado, the superintendent of the hospital at San Haven, spoke on the "Management of Tuberculosis and Methods of Detection, using the PPD Skin Test."

Officers elected for 1959 are as follows: president, Dr. Sam Shea; vice-president, Dr. William Kitto; and secretary-treasurer, Dr. Lloyd A. Giltner.

During the year, 4 new members were admitted to the society: Dr. A. R. Cuadrado, San Haven; Dr. W. F. McCullough, Bottineau; Dr. G. H. Heidorn, Minot; and Dr. David Halliday, Kenmare.

Three members transferred from the society: Dr. Joseph Clark, Dr. George Loeb, and Dr. P. A. Cancilla.

Total membership is 66; active members number 61; and 5 are retired or honorary members.

D. J. HALLIDAY, M.D., Councillor

Fifth District

The Sheyenne Valley Medical Society held 5 dinner meetings at Mercy Hospital in Valley City during 1958. A scientific program was presented at each meeting.

At the February meeting, a film on "Diagnosis and Treatment of Heart Diseases" was viewed and discussed.

In March, Dr. John Magness, of the Department of Medicine at Dakota Clinic, Fargo, spoke on "The Use and Abuse of Steroids." Dr. J. Spier, pathologist at St. John's Hospital, Fargo, discussed pathologic aspects of this subject.

A Grand Rounds film on "Current Therapy of Diabetes" was shown at the September meeting.

In October, Dr. J. B. Murray and Dr. John Magness, of the Dakota Clinic in Fargo, discussed "The Indications for and the Technic of the Beck Operation for Coronary Heart Disease."

Officers elected in January for the 1959 term are: president, Dr. J. P. Merrett; vice-president, Dr. N. A. MacDonald; and secretary-treasurer, Dr. C. J. Klein. Delegate: Dr. N. A. MacDonald. Alternate delegate: Dr. C. J. Klein.

Total active membership in the society is 9, with 1 retired member. Dr. John Goven became an active member in April 1958 and Dr. Warren Jensen in July.

G. CHRISTIANSON, M.D., Councillor

Sixth District

The Sixth District Medical Society met February 26, 1958, at Bismarck. There were 41 physicians in attendance. Two movies were presented: "The Doctor Defendant" and "The Medical Witness." Dr. R. W. Rodgers, president of the North Dakota State Medical Association, was introduced and gave his report. Dr. Herbert J. Wilson's case-finding project regarding tuberculosis at the Fort Berthold Indian Reservation was approved by the society.

The next regular meeting was held on March 20, 1958, at Bismarck. Sixty-one physicians were in attendance, including local dentists and guests. The scientific program consisted of two lectures on "Carcinoma of the Head and Neck" by Dr. Matton and Dr. Remind. This program was at the courtesy of the North Dakota State Cancer Society. At this meeting, Dr. Alice Peterson of the North Dakota State Health Department was elected to membership. Dr. Adolfs A. Curiskis of Elgin was transferred from the Southwestern District to active membership in the Sixth District Medical Society. At the same time, Dr. John T. Boyle of Garrison, a member of the Sixth District Medical Society, requested transfer to the Northwest Medical Society. This was granted. The local society approved setting up Poison Control Centers at the Bismarck and St. Alexis hospitals.

The next regular meeting was held October 14, 1958, at the Bismarck Hospital. Forty-three members and 7 guests attended. Dr. Walter F. Pretorius, chairman of the Heart Disease Control of the State Department of Health was introduced and outlined his program. Dr. E. P. Bryant, a transfer from the Devils Lake Medical Society, was accepted to the Sixth District Medical Society. At this meeting, approval was given for the State Health Department's program in eradicating beta hemolytic Streptococcus in Bismarck. The program outlined by Dr. Pretorius of the State Health Department was approved. At this meeting, Dr. Richard Tudor, of Minneapolis, spoke on "Early Recognition of Mental Retardation."

The next regular meeting was held November 18, 1958. Forty-seven members and guests were present. The speaker of the evening was Dr. Frank Melton, of the Dakota Clinic, Fargo, who spoke on "Contact Dermatitis." At this meeting, Dr. T. L. Stangebye, of Bismarck, Dr. W. G. Garrett, of Bismarck, and Dr. J. Anthony, of Napoleon, were accepted as members of the

society. The councillor's report was given by Dr. C. H. Peters. The report was accepted unanimously. The "relative value" schedule was then discussed in detail by the councillor.

During the year, Dr. Leonard Fredricks, a long and active member of the Sixth District Medical Society, passed away at his home at Bismarck. Dr. Fredricks had been a member of the Sixth District Medical Society for many years, and his loss has been keenly felt by all. Regrets of this society were expressed to his family. He will long be remembered for his contributions to medicine in this area.

Officers for 1958 were: president, Dr. Herman J. Bertheau, Linton; vice-president, Dr. Phillip Dahl, Bismarck; and secretary-treasurer, Dr. C. R. Montz, Bismarck. Board of Censors: Dr. G. R. Lipp, Bismarck; Dr. E. D. Perrin, Bismarck; and Dr. P. L. Owens, Bismarck. Delegates: Dr. M. E. Nugent, Bismarck; Dr. R. B. Tudor, Bismarck; Dr. C. J. Baumgartner, Bismarck; Dr. E. G. Vinje, Hazen; and Dr. R. W. Henderson, Bismarck.

Officers for 1959 are: president, Dr. Phillip Dahl, Bismarck; vice-president, Dr. Marlin Johnson, Bismarck; and secretary-treasurer, Dr. C. R. Montz, Bismarck. Delegate: Dr. M. A. K. Lommen, Bismarck, whose term expires in 1961.

C. H. PETERS, M.D., Councillor

Seventh District

During the past year, 5 dinner meetings were held at the Jamestown Hospital.

The first meeting was held May 22, and 17 members attended. Our guests were the affiliated medical students from the University of North Dakota, David Holtan, Clement Q. Ming, and Mary Ann Braaten; and Drs. Thiery, Cukurs, and Boosalis of the State Hospital. The business portion of the meeting consisted of a report from Dr. Pederson of the actions of the state House of Delegates meeting in Minot in May. The program was presented by Dr. Lee Christoferson, of Fargo, who gave an interesting and illustrative paper concerning the medical-legal implications of head injuries.

The next meeting was on September 25 with 13 members present, including guests Mr. Lyle Linond, the state society executive secretary; George Michaelson, of Bismarck, the field representative of the North Dakota Heart Association. At this meeting, Drs. Ted Harris, Roger Engberg, and J. J. Jestadt, Jamestown; Rudy Klassen, LaMoire; and Eugene Bolliger, Ellendale, were approved as members. Drs. Dagg, of Ellendale; Cameron, of Kulm; and MacDonald, of Gackle, left the community since the preceding meeting. At this meeting, the highlights of the A.M.A. House of Delegates session in San Francisco in June were presented by Dr. Pederson and discussed by the society. The program consisted of two films, one of the A.M.A. highlights of the convention in San Francisco and the other "Grand Rounds No. 7," sponsored by the Upjohn Company.

The next meeting, on November 24, was attended by 16 members. The guests included Mr. Ed Sympnieske, the executive director of the North Dakota Tuberculosis and Health Association, and Dr. A. R. Cuadrado, superintendent of San Haven Sanatorium. Other guests were Drs. Boosalis, Thakor, and Thiery of the State Hospital. The usual business of the meeting was conducted, and Dr. E. J. Larson talked at length about the practical implications of the relative value fee schedule, which was discussed by the society. The program for the evening was presented by Dr. Cuadrado, who spoke in a general manner on the problems of tuberculosis as it exists in our state and nation today.

The next meeting was held January 29 with 19 members present. Guests were Dr. O. A. Sedlak, president of the North Dakota State Medical Association; Dr. Perry Triggs, of the Fargo Clinic; and Drs. Icenogle and Laurich of the State Hospital. At this meeting, Dr. P. Cukurs, Dr. S. Thakor, and Dr. Jose Alfonso were approved as members of the society. Dr. Sedlak talked about legislative problems currently encountered in the biennium session. Mr. Don Eagles talked in a general manner about Blue Shield and its problems. Stutsman County Society again decided to help sponsor the District Science Fair. The program of the evening was presented by Dr. John Young, of the State Hospital, who spoke at length on the classification of mental disease and spoke briefly on the practical management of these problems by the family physician.

The next meeting took place February 26 with 16 members present. Guests included Dr. O. A. Sedlak, who spoke again on legislative problems encountered at the biennium session and briefly about other problems medicine is encountering in North Dakota. Mr. Don Eagles again conveyed some of the recent thinking of the Blue Shield Board of Directors. The program was presented by Dr. G. Alfred Dodds, of Fargo, who gave an interesting paper on the "Emergency Surgery Conditions of the Thorax in Infancy and Childhood."

Officers elected for 1959 are: president, Edwin O. Hieb, Jamestown; vice-president, Neville Turner, LaMoire; and secretary-treasurer, R. D. Nierling, Jamestown. Delegates: John Van der Linde, Jamestown; and John Elsworth, Jamestown. Alternate delegates: John Swenson, Jamestown; and Robert Lucy, Jamestown. Board of Censors: John Young, Jamestown; E. O. Hieb, Jamestown; and John Van der Linde, Jamestown. Blue Shield directors: Joseph Sorkness, Jamestown; and E. J. Larson, Jamestown. Blue Cross representatives: Joseph Sorkness, Jamestown; John Van der Linde, Jamestown; Robert McFadden, Jamestown; Ellis Oster, Ellendale; and John Elsworth, Jamestown.

Membership of the district includes 35 active members, 1 retired member, and 2 honorary members.

Nine new members were added during the year. Five members who transferred out of state or to other district societies are: R. O. Saxvik, Jamestown; D. M. Cameron, Kulm; E. W. Dagg, Ellendale; R. G. MacDonald, Gackle; and M. A. Hayward, Gackle. No deaths occurred during the year. There are no nonmembers residing and practicing in the district.

T. E. PEDERSON, M.D., Councillor

Eighth District

The Eighth District Medical Society is comprised of physicians practicing in the Watford City, Tioga, Crosby, and Williston area. Currently, there are 19 members. No new members have been added in the past year.

In October 1958, a meeting was held in the staff room of Mercy Hospital, Williston, at which time certain principles were formulated for our members regarding press-radio-television participation.

The association met at the Harmon Park Clinic in November for a banquet. Mr. Don Eagles and Dr. Russell Saxvik and Dr. John Young of the State Hospital were guests. Each spoke of matters pertaining to his special field.

On January 28, 1959, the annual meeting and election of officers for the ensuing year were held. The following officers were unanimously elected: president, Dr. Duane Pile, Crosby; vice-president, Dr. Chester Borrud, Williston; and secretary, Dr. H. C. Walker, Jr., Williston. Delegate: Dr. Dean Strinden. Alternate delegate: Dr.

E. H. Hagan. District representative of the Physicians Service Corporation: Dr. Donald Skjei.

The society again entertained the annual cancer caravan at a dinner in the Elk's North Dining Room, after which Dr. E. G. Harrison, surgical pathologist at Mayo Clinic, gave a paper on "Exfoliative Cytology." This was followed by a paper on "Cancer of the Colon and Rectum" by Dr. Martin Adson, also of the Mayo Clinic.

JOSEPH D. CRAVEN, M.D., Councillor

Ninth District

The Southwestern District Medical Society held 7 official meetings in 1958. We have 25 members, 2 of whom are retired.

The first meeting, held February 9, was essentially a business meeting. Just previous to this meeting, one of our members, Dr. K. M. Murray, of Scranton, died. Miss Dorothy Landon, of the North Dakota Rehabilitation Center at Grand Forks, described the objectives of the Center and what its facilities are. There was a general discussion of rehabilitation work in North Dakota.

The second meeting was held March 19. After a short business session, the scientific meeting was conducted by the speakers of the Cancer Caravan. Dr. C. M. Lund, of Williston, spoke on "General Function and Activities of the North Dakota Cancer Society." Dr. W. H. ReMine and Dr. J. K. Masson, of the Mayo Clinic, spoke on "Cancer of the Head and Neck." We found this meeting to be very instructive and applicable.

The third meeting was held April 19. The members of the society gave instructions to our delegates for the state meeting to be held in Minot. Our district society approved the principle of "claims committee" and approved the principle of medical malpractice insurance for physicians in North Dakota. Our society disapproved of compulsory payments to the American Medical Education Fund through increased dues. Our group thought that such payments should still remain a voluntary donation. Scientific films were shown.

Our fourth meeting was held June 14 at Mott. We were guests of our district society president, Dr. Robert E. Hankins. Reports were made by the officers who had attended the state meeting at Minot. Attendance was small because of the extremely bad road conditions.

The fifth meeting was held October 11, 1958. A short business meeting was held. Our guest speaker was Dr. James Miles, of Jamestown, who covered three subjects in his talks: (1) Technique of Venous Cutdown, (2) Poison Control and Treatment Centers in North Dakota; and (3) Peptic Ulcers in Children. St. Joseph's Hospital, Dickinson, was appointed the poison center for the Southwestern District.

The sixth meeting was held November 22. This meeting was composed essentially of discussions on tuberculosis. Representatives of the North Dakota Tuberculosis Society were present. The guest speaker of the evening was Dr. A. R. Cuadrado. He spoke on "The Incidence of Tuberculosis in the United States and Its Prevalence in the Older Group." He thinks that the older group of tuberculosis patients in the United States is a rather neglected group and that the tuberculosis problem is far from settled.

The seventh and final meeting was held on December 13. Routine order of business was carried through.

Election of officers for 1959 was as follows: president, Dr. Richard F. Raasch, Dickinson; vice-president, Dr. Walter C. Hanewald, Richardson; and secretary-treasurer, Dr. Donald J. Reichert, Dickinson. Delegates: Dr. Robert F. Gilliland, Dickinson; and Dr. Keith G. Foster, Dickinson. Alternate delegates: Dr. Robert E. Hankins,

Mott; and Dr. W. J. Knickerbocker, Hettinger. Councilors: Dr. Robert C. Thom, Bowman; and Dr. W. M. Buckingham, Elgin; and Dr. Norman Ordahl, Dickinson. North Dakota Physicians Service Corporation members: Dr. R. W. Rodgers, Dickinson; Dr. Amos R. Gilsdorf, Dickinson; and Dr. R. F. Gilliland, Dickinson. North Dakota Physicians Service Board Directors: Dr. R. W. Rodgers, Dickinson.

During the year of 1958, no urgent emergencies arose in our society.

A. R. GILSDORF, M.D., Councillor

Tenth District

The Tenth District Medical Society held only 2 formal meetings in 1958.

Each meeting was a dinner meeting followed by a business and scientific session, and then a coffee hour was held in the home of one of the doctors.

On February 26, 1958, 7 members met at Union Hospital in Mayville to see the Grand Rounds film on "Coronary Heart Disease." As a guest, we had Mr. Owen Ellingson of the Upjohn Company.

Again, on September 12, 6 members met at Union Hospital at Mayville. We had the filmed Grand Rounds on highlights of the A.M.A. session and the Diabetes Round Table. There also was a discussion on the Malpractice Insurance possibly being offered by the North Dakota State Medical Association. Blue Shield policies were also brought up at this meeting. Mr. Owen Ellingson was again our guest.

Officers elected for the year 1959 are: president, Dr. Keith Vandergon, Portland; vice-president, Dr. James M. Little, Mayville; and secretary-treasurer, Dr. R. W. McLean, Hillsboro. Delegate: Dr. R. W. McLean, Hillsboro. Alternate delegate: Dr. James M. Little, Mayville. Censors: Dr. Mervin Rosenberg, 3 years; Dr. R. C. Little, 2 years; and Dr. D. N. Mergens, 1 year.

The membership consists of 9 active members, 1 honorary retired member, and 1 member in the armed services. No nonmembers are practicing in this district.

K. G. VANDERGON, M.D., Councillor

REPORTS OF STANDING COMMITTEES

Committee on Medical Education

A meeting of the Committee on Medical Education was held on May 4, 1958, at Minot. There were 9 members present. The dean gave the following information on the status of medical education in the United States at the present time.

"There is still a shortage of places for the first two years of medicine. Many schools have expanded their capacity the last two years, and this expansion has been greater for the last two years of medicine than the first two. The medical schools in the United States can now handle 600 to 700 more students for the last two years than formerly.

"Arizona, Montana, and Idaho are considering establishing two-year schools. At the present time, there are only 2 applicants for each vacancy for the first year of medicine in the United States as a whole. Of these 2 applicants for each place, many are not qualified, so that the total number of qualified applicants is not much more than the vacancies available.

"The mortality of the North Dakota students after completing the first two years in North Dakota and going elsewhere has been very low, and probably lower than the national average for the mortality in the last two years.

"Most of the students from North Dakota have made

excellent records after transferring. Many have made A.O.A.

"Most of the loan funds available to North Dakota students for the first two years have been exhausted. Over \$54,000 has been loaned out of the state fund last year."

It was felt that it would be advisable to have Senate bill 181 amended, so that a medical student that returned to North Dakota for an internship or a residency, or accepted a position in a state institution, would receive the same 20 per cent discount in the amount owed the state on the loan fund as a doctor who returned and practiced in a small community as contained in the original bill.

An amended report of the Committee on Medical Education was, therefore, submitted to the House of Delegates. A copy of this report follows.

Dean Harwood felt that this committee should meet at more frequent intervals. It was also decided to hold a meeting next year at the time of the state meeting, which was done this year.

Dean Harwood reported that short postgraduate courses will be started at the Medical School in the near future.

Amended Report of Committee on Medical Education. We suggest that the Committee on Legislation attempt to have the legislature pass the following amendment to Senate bill 181, which deals with loans to third and fourth year medical students.

Any doctor who has borrowed funds under this bill who returns to the state for his internship or residency or accepts a position in a state institution be allowed one-fifth credit for each year so spent on the unpaid balance of the loan and one-fifth of the accrued interest thereon.

Mr. Lyle Limond and the members of the North Dakota State Medical Association Committee on Legislation interviewed our friends in the legislature. They were advised that this was not the opportune time to introduce the amendment to Senate bill 181. The proposed amendment was, therefore, not introduced at this session.

Dean Harwood reports the following in regard to the medical school:

"Inasmuch as our medical students are the primary reason for our existence, it seems only appropriate that we begin this report by telling you about them.

"For the class which was admitted in the fall of 1958, we admitted 43 students, but 2 withdrew before school started. Since that time, 4 have withdrawn, leaving us with a class of 37. Two left us because they felt they were in the wrong field. The others had either personal or family problems.

"We have 33 second-year students. Transfer acceptances are running ahead of schedule. Two of our students were accepted by a school which announced they would have to start their junior year in the middle of June. Facing a loss of summer earnings, both boys rejected the offer and, on February 3, applied elsewhere. Both won acceptances in letters dated just ten days later. Of course, all schools do not act too rapidly on applications. In general, we have no problem transferring our graduates. In the past ten years, 327 have transferred to 46 different medical schools in this country and in Canada.

"The crop of applicants now under consideration for the fall of 1959 looks a good deal better than in the past several years. What pleases us most is the fact that the bulk of the good ones are from North Dakota. We have already accepted 34 and have several more whose progress we are watching during the second semester. The

chances of admission of more than one nonresident are extremely remote.

"Our students continue to do well after they transfer, and the best ones win their share of honors. Four of those who are at present interning were elected to A.O.A. at Bowman Gray, Northwestern, Harvard, and Pennsylvania. In the present fourth-year class, 1 student at Bowman Gray and 1 at Pennsylvania have been similarly honored.

"The Ireland Laboratories were occupied the first week in January 1959 and have been in progressively more active use since that time. They were dedicated with an appropriate ceremony on March 10. The building, a one-story facility, provides 5,000 sq. ft. of space to house the research activities which are primarily concerned with cancer. The construction of these laboratories was made possible by a gift of \$75,000 from Mrs. Bertha Ireland, with an equal amount from the National Institutes of Health and \$50,000 from Medical Center funds. There have been a total of 763 publications as a result of earlier grants by the Ireland family to this laboratory. Other departments in the School of Medicine, as well as in the University, have been invited to make use of the equipment. A year ago, Dr. Miroff was appointed the Lee Ann Hocking Research Professor in Biochemistry financed by a grant from the National Cancer Society. Both in the Ireland Laboratory and elsewhere in the School of Medicine, tax money is not used to buy research equipment. It must all be bought with grant funds.

"For the year 1958-1959, the Medical Center Loan Fund Board awarded its entire annual allotment of \$75,000 to 40 third- and fourth-year students who had filed applications. We do have other loan funds, but some of them are so new that they have not become fully revolving. The fund established by the Woman's Auxiliary is growing rapidly and contributions to date have reached a total of over \$14,000. Practically all of this is out on loan and starting next year, repayments will be accelerated and the cash available for loans each year will rapidly increase. There is a continuing need for loans and these requests exceed our available funds.

"Dr. A. F. Samuelson, a native of Turtle Lake, has been awarded the first psychiatric training grant under the terms of a 1957 law which set up a five-year residency program, the last two years to be spent at the State Hospital in Jamestown. We have had a limited number of inquiries about this program, but no one else has followed through on it.

"Your most welcome contributions which come to us through the American Medical Education Foundation added up to \$4,544.33 this year. That is a gain of 10 per cent over your donations a year ago. To us, this is probably the most important fund at our disposal. We use it for expenditures which we normally cannot charge to mill levy funds and to meet unforeseen nonrecurring expenses not covered by our regular budget. We hope that more of you will remember us when you write checks to the various charities which you support each year.

"In closing, I would like to point out that the Medical Center, at this time, cannot support any more enterprises which people outside of our profession may dream up. The cost of our School of Medicine covers much more than just educating our medical students. Last year, service courses were taught to 292 other students on campus. In addition, our Medical Center budget supports a degree nursing program, the Blood Bank, the medical technicians program, the Rehabilitation Unit, the grants for psychiatric residencies, and our loan pro-

gram for our transfer students. Our receipts and expenditures are approximately in balance, and we cannot afford now to support any more activities."

The National Foundation, Incorporated, which is the new name for the polio group, has set up a \$2,000 fellowship for a medical student in this state. This will pay \$500 a year for four years. Dr. Sedlak has designated the Medical Education Committee to make the selection for this award in this state. Blanks for the application for this fellowship will be sent to Dean Harwood to give to interested medical students. It is expected that all the applications will be in by June or July, and this committee will then make its recommendation. Similar fellowships are to be awarded in nursing, physiotherapy, occupational therapy, and so forth.

H. M. BERG, M.D., Chairman

Committee on Necrology and Medical History

*We shall rest, and faith we shall need it,
Lie down for an acon or two,
Till the Master of All Good Workmen
Shall put us to work anew.*

RUDYARD KIPLING

NILS TRONNES, M.D.

Dr. Nils Tronnes, 81, longtime Fargo physician, died July 21, 1958, in a Fargo hospital shortly after being admitted.

Dr. Tronnes was born in Oslo, Norway, October 14, 1876. He completed his high school education in 1894 and became a private tutor.

A premature explosion of dynamite which had mutilated a workman's hand sparked his interest in medicine and after seven and one-half years of schooling in Oslo, he received his medical diploma, cum laude, from the Oslo University in June 1903.

Dr. Tronnes interned aboard ships and practiced about six months in Aalesund, Norway, before migrating to Fargo in 1904. He was licensed to practice medicine in North Dakota the same year. On his arrival here, he joined Dr. Tonnes Thams, who founded and operated St. Olaf's Hospital near the present site of St. John's. After Dr. Thams left for Maddock, North Dakota, Dr. Tronnes was joined by Dr. Olaf Sand, who had been practicing at Pelican Rapids, Minnesota.

Dr. Tronnes and Dr. Sand reopened St. Olaf's Hospital and later helped found St. Luke's Hospital in 1907 and the Fargo Clinic in 1919.

In 1920, he was elected to the American College of Surgeons. He received a knight's medal from the Norwegian Student Singer's Association in Oslo in 1940 for his interest in music. He had been a strong supporter of the Fargo-Moorhead Symphony Orchestra.

In 1953, he received the Knight of St. Olaf medal from the King of Norway for his contributions to the honor of Norway while serving as a doctor in Fargo. Also, in 1953, he became a 50-Year Club member of the North Dakota State Medical Association and an honorary member in 1954.

Dr. Tronnes' hobbies had included chess, billiards, bridge, and hunting.

Dr. Tronnes had returned to Norway several times to visit his family, making his last trip in 1950. He had also studied surgery in England and Denmark.

On November 1, 1905, he married Randi Larsen. She died in 1948. Surviving are a son and 3 daughters.

H. B. HUNTLEY, M.D.

Dr. Howard B. Huntley, 82, physician in the Kindred-Leonard, North Dakota, communities for nearly fifty years, died December 2, 1958.

Born in Bloomville, Ohio, April 14, 1876, Dr. Huntley came to Dakota Territory in 1882. After completing his elementary education, he entered high school of NDAC and also studied in Fargo College Academy.

When the Spanish-American War broke out, he joined Company B of Fargo and served more than a year in the Philippines.

Returning to Fargo, he entered Fargo College, receiving a degree in 1904, and then entered Northwestern University. He received his medical degree there in 1908. He was licensed in North Dakota in 1908 and began practice at Gackle, North Dakota, that same year. In December, 1909, he began practice at Leonard.

He moved to Kindred in 1934, serving both communities. Dr. Huntley had been honored at a recognition day in Leonard in 1949. He was given recognition as an honorary member at the Minot meeting in 1958.

In 1911, Dr. Huntley married Ida Pauline Martinson of Pelican Rapids, Minnesota. Besides his wife, he leaves 2 sons and 4 daughters.

L. H. FREDRICKS, M.D.

Dr. L. H. Fredricks, 57, of Bismarck, died April 27, 1958, after a long illness.

He was born at Crookston, Minnesota, in April 1901 and received his elementary and high school education in the Crookston public schools. He received his B.S. degree at the University of Minnesota in 1926 and his M.D. in 1928.

He was licensed to practice medicine in North Dakota July 1928 and since that time was a member of the staff of the Quain and Ramstad Clinic in Bismarck. He was a member of the staffs of the Bismarck and St. Alexius hospitals.

He was a diplomate of the American Board of Internal Medicine, a fellow of the American College of Physicians, a member of the North Dakota State Medical Association and of the A.M.A. He was president of the Sixth District Medical Society in 1951. He was actively interested in mental health problems and was one of the founders of the North Dakota State Mental Health Association and served as one of its directors.

He was active in the Lutheran Brotherhood and served as the president of the Bismarck Lutheran Brotherhood in 1935, 1937, and 1939. He was a member of Kiwanis and belonged to the Masonic Lodge and Scottish Rite bodies.

He is survived by his wife, a son, and a daughter.

Respectfully submitted,

E. H. BOERTH, M.D., Chairman

Committee on Public Health

The following is a report of the Public Health Committee of the North Dakota State Medical Association for the past year. The committee has had no formal meeting and it has been contacted only in regard to one matter which I will mention in my report.

During the year, your chairman appeared at the hearing of the North Dakota State Senate Committee on the milk control bill. I did not appear as a representative of the whole committee, but it may be of interest to know that the physicians of the Sixth District Medical Society went on record as being opposed to this bill.

Also, March 3, 4, and 5, I attended a seminar on venereal disease as a guest of the North Dakota State Health Department. This was held in St. Louis, and it was apparent that the deep South has a real problem in the control of venereal diseases among the Negroes in that part of the country.

I was approached by representatives of the National

Polio Foundation who stated that the Foundation had furnished polio vaccine through its local chapters and had also paid physicians to work in immunization clinics throughout the state. The total amount spent was in the neighborhood of \$25,000. He requested that I call the members of the Public Health Committee and get their reactions to having the State Health Department handle polio vaccine in the same manner it handles smallpox vaccine and DPT. Consequently, I sent a copy of the following letter to them:

"As chairman of the North Dakota Public Health Committee, I was approached yesterday by a representative from the National Polio Foundation. He stated that the North Dakota chapter had spent about \$25,000 last year furnishing polio vaccine and paying for physicians' time in giving vaccine at clinics. He stated that it was really against the rules of the National Foundation for the local chapters to do this. He asked me to poll the members of this committee as to whether or not they would recommend that Salk vaccine be handled by the North Dakota State Department of Health in the same manner as smallpox vaccine and DPT. As you know, the latter are furnished free to organized clinics who charge a nominal fee for their services. I am not sure if this arrangement can be made with the State Department of Health due to its limited biological budget; however, the representative from the Foundation said that it might be possible for it to assist the Department of Health in the purchase of vaccine if the medical profession desired it to be furnished in this manner.

"I am enclosing a postal card for your vote in regard to this. I would appreciate an early reply so that we can get this to the House of Delegates in the coming May meeting in Bismarck."

Following are the results of this poll: Two members were entirely against the State Department handling the

vaccine. One member favored it with reservations. Seven members, including myself, favored the North Dakota State Health Department handling the vaccine. It is my presumption that the National Polio Foundation desires to use its funds for the new activities it is planning on engaging in.

PERCY L. OWENS, M.D., Chairman

Committee on Official Publication

The Committee on Official Publication held no meetings during 1958.

At the annual meeting of the North Dakota State Medical Association, held in Fargo in May, 1957, the House of Delegates voted that the contract with THE JOURNAL-LANCET was to be for a period of three years. The contract still has one year to run.

The committee will welcome any suggestions if any member of the association desires any change in THE JOURNAL-LANCET as to publication, number of reprints given on articles, and so forth.

E. H. BOERTH, M.D., Chairman

Committee on Legislation

Your Committee on Legislation had a comparatively active and a rather successful year thanks to the devotion of a number of medical men in our association and our ever alert executive secretary, Mr. Lyle Limond.

Accompanying this is a group of bills, which directly or indirectly affected the practice of medicine in North Dakota, which came up before the legislative session this past winter and were followed, objected to, or supported, as the case indicated and as our executive secretary and the rest of the members had been instructed by our Legislative Committee. All in all, the legislative activity was in favor of the medical association in the State of North Dakota.

Bill No.	Provisions of bill	Our action	Outcome
HB 505	Appropriates \$487,975 for the State Health Department	Supported	Passed
HB 522	Appropriates \$13,010,389 for the Public Welfare Board	Followed	Passed
HB 532	Appropriates \$52,000 for nurse preparation scholarships	Followed	Passed
HB 533	Appropriates \$50,252 for State Commission on Alcoholism	Supported	Passed
HB 546	Establishes State Rabies Control Committee	Followed	Passed
HB 567	Amends law to provide additional amount for county superintendent's contingency fund for county special education, guidance, or pupil personnel services. Permissive at \$5 per capita per school child	Supported	Defeated
HB 597	Creates State Milk Control Board	Followed	Defeated
HB 598	Authorizes counties and municipalities to provide ambulance service	Supported	Passed
HB 612	Increases maximum and minimum benefits of Workmen's Compensation	Followed	Passed
HB 617	Replaces commissioners of Workmen's Compensation Bureau with director; establishes Appeals Board	Followed	Defeated
HB 650	Creates Board of Masseurs with licensing powers	Token opposition	Passed
HB 658	Requires that 20 per cent of all fees collected by Governing Boards of all occupations and professions shall be deposited in general fund	Opposed	Defeated
HB 697	Requires school districts to provide special education for handicapped children (trainable), provides state aid, repeals chapter on special education of exceptional children	Opposed	Defeated
HB 717	Provides for licensing of agents of life, accident, health, and hospital insurance	Followed	Defeated
HB 723	Appropriates \$7,500 for legislative research study of mental health facilities	Supported	Passed
HB 727	Geriatrics hospital at Carrington	Followed	Defeated
HB 732	Taxes and nonprofit groups	Followed	Defeated
HB 743	Permits commissioner of insurance to approve forms of insurance policies other than standard policy	Followed	Passed
HB 774	Appropriates \$1,000,000 from state welfare fund for grants-in-aid to nonprofit corporations for construction of infirmary additions to homes for aged	Followed	Defeated
HB 823	Makes county responsible for 10 per cent of cost of aid to dependent children instead of half such cost	Followed	Passed
SB 2	Appropriates \$186,360 for School for the Blind	Followed	Passed
SB 3	Appropriates \$507,096 for the School for the Deaf	Followed	Passed
SB 4	Appropriates \$3,149,086 for Grafton State School	Followed	Passed
SB 5	Appropriates \$1,372,721 for Tuberculosis Sanatorium	Followed	Passed

Bill No.	Provisions of bill	Our action	Outcome
SB 6	Appropriates \$5,692,918 for State Hospital	Followed	Passed
SB 7	Appropriates \$940,281 for State Training School	Followed	Passed
SB 17	Special education for exceptional children—budget for	Supported	Passed
SB 40	Revises general partnership and limited partnership laws by adopting basic law of Uniform Partnership Act	Followed	Passed
SB 41	Revises general nonprofit corporation laws by adoption of basic law of Model Nonprofit Corporation Act	Followed	Passed
SB 58	Authorizes citizens upon written request to inspect public welfare records; provides penalties	Supported	Defeated
SB 86	Geriatric Hospital at or near Rugby	Followed	Defeated
SB 98	Appropriates \$30,000 for education of children who are both deaf and blind in out-of-state institutions	Supported	Passed
SB 100	Authorizes participation of licensed chiropodists in the Blue Shield plan	Opposed	Defeated
SB 108	Children's Psychiatric Hospital	Supported	Passed with amendments
SB 109	Revises pharmacy laws	Followed	Passed with amendments
SB 118	Osteopaths to be given full surgical and drug privileges	Opposed	Defeated
SB 126	Registers and regulates physical therapists	Supported	Passed
SB 142	States that any person operating a motor vehicle shall be deemed to have given consent to chemical test of intoxication; provides for revocation of driving privilege upon refusal to submit to test and provides for hearing and judicial review	Supported	Passed
SB 163	Concerned with State Board of Dental Examiners	Followed	Passed
SB 177	Deals with health and accident insurance policies	Followed	Defeated
SB 180	Authorizes Blue Cross to write an extended benefit contract	Supported with an amendment	Passed
SB 184	Deletes limit of 90 days of hospital care allowed for vocational rehabilitation	Followed	Passed
SB 193	Requires certain persons to report names and addresses of blind persons under 21 years of age to superintendent of School for the Blind	Followed	Defeated
SB 237	Amends Medical Student Loan Fund Act to cover dental students	Followed	Defeated
SB 256	Provides that counties may establish homes for the aged and issue bonds to raise funds for such projects, permits excess levy of 4 mills	Followed	Withdrawn
SB 267	Amends Workmen's Compensation Bureau rule-making power to drop commission's authority to determine fees for legal, medical, and hospital services	Followed	Defeated
SB 273	Establishes a grants-in-aid program to nonprofit corporations for construction of nursing homes for aged and infirm; appropriates \$1,500,000	Followed	Withdrawn
SB 281	Amends definition of exceptional children	Opposed	Withdrawn
SB 285	Permits serving of liquor in restaurants at option of county, city, or village	Followed	Defeated
SB 290	Creates revolving fund to make loans for construction of nursing homes and homes for the aged	Followed	Passed

The Jenkins-Keogh, Simpson bill, House of Representatives bill No. 10, was recently passed by the House of Representatives and is now before the Senate. There appears to be some justification to suspect that this may pass this year. I sincerely hope that the membership of this association finds that they have enough time and also that they are in sympathy with the bill to the extent that they contact our constituent representatives in Washington.

Your committee met in the Gardner Hotel, Fargo, on January 17, 1959. The entire membership was present together with Dr. O. A. Sedlak, president of the North Dakota State Medical Association; Mr. George Michaelson, director of the North Dakota Jaycees; and Mr. William Unti, executive director, North Dakota Society for Crippled Children; and Mr. Lyle A. Limond. The evening was spent in reviewing a number of legislative bills that were coming up in the legislature, and these bills were discussed and rated as to whether they should be supported, opposed, or simply followed.

It is evident both nationally and on a statewide basis that health bills are occupying the spotlight insofar as legislation in general is concerned. The number of bills presented in the North Dakota State Legislature that would have affected the North Dakota State Medical Association had numerically increased in the last session over that which it has been in previous sessions. This increase is gradual.

Likewise, on a national basis, the number of health bills that are being considered and are being brought to the floor of Congress is markedly increasing. On a basis of such increase in legislative activity on both the state and national basis, it would behoove us as medical men to become more informed and active in legislative matters both locally and on a national scale if we wish to further and foster the private enterprise practice of medicine.

O. W. JOHNSON, M.D., Chairman

Committee on Medical Economics

This committee has been extremely active during the past year. In June, 1958, the chairman directed a letter to Mr. Donald Eagles, executive vice-president of the North Dakota Blue Shield, informing him that the Medical Economics Committee would like to initiate and cooperate with Blue Shield-Blue Cross and commercial insurance carriers in North Dakota in an educational attempt to point out to the public, the hospitals, and the medical profession the hazards of abuse and overutilization of medical and surgical insurance. An immediate response was obtained from Mr. Eagles; Mr. Ronald Jydrup, executive director of Blue Cross; Dr. Sedlak, the North Dakota State Medical Association president; and a meeting was held in Bismarck in July 1958 to outline briefly a possible course of action.

This program was then presented to the entire Med-

ical Economics Committee at a meeting held in Fargo on September 13, 1958. This program received unanimous endorsement of the committee and has now been placed into effect utilizing telecasts, direct mailing to physicians and subscribers, pamphlets enclosed in billings to subscribers, education through the subscriber's council Blue Cross, posters distributed to physicians and hospitals to be displayed in prominent places, and numerous newspaper releases. Further implementation of this program is to be expected. Medicine has a great stake in voluntary health insurance. Unless we, as a profession, are willing to protect this program, it will undoubtedly step in to fill the void. Therefore, it is imperative that the profession give its cooperation in this educational program as presented in North Dakota.

Relative value schedule. Likewise, in July 1958, an intensive speed-up in the program to develop a "relative value schedule" was inaugurated. As you recall, the House of Delegates instructed this committee to develop such a program at the last annual session. The California Medical Association's relative value study was adopted as a basic program at which to begin work. All specialty societies in North Dakota, including the North Dakota chapter of the American Academy of General Practice and other specialties which were not represented by specialty societies, were contacted and asked to approve or disapprove the portion of the relative value schedule that applied to them. They were given approximately six weeks to let the Medical Economics Committee know their feelings and decisions on this schedule. We received corrections from the following organizations only: the North Dakota Society of Internal Medicine, the North Dakota Society of Obstetrics and Gynecology, the North Dakota Radiological Society, and the North Dakota Society of Pathologists. Following collection of this information, the revisions and the original relative value schedule were presented to the Medical Economics Committee on September 13, 1958, at Fargo. The relative value schedule with its revisions was unanimously adopted and was printed in October 1958 and distributed to the entire membership of the North Dakota State Medical Association. With this relative value schedule adopted, the Medical Economics Committee was then in a position to begin negotiations with various state and national agencies regarding the medical fee schedules. It is well to stress at this point that by common use of the relative value schedule certain inequities will be found. It is imperative that revisions be made in this schedule at intervals of at least every two years. Otherwise, they will soon become out-dated, and the schedule will lose its practical value.

Welfare Board. In September 1958, the North Dakota State Public Welfare Board was informed that we were preparing a new fee schedule and that we wished to arrange negotiations with it. Mr. Carlyle Onsrud, the executive director, or Mr. Ralph Atkins, of the Public Welfare Board, met with our negotiating team approximately five times through October and November preparing the preliminary draft of our negotiations. On November 19, Dr. E. J. Larson, of Jamestown, a member of the Medical Economics Committee; Mr. Lyle Limond, executive secretary of the North Dakota State Medical Association; and myself, as chairman of the Medical Economics Committee, presented a lengthy brief to the Public Welfare Board of the State of North Dakota, including Mr. Onsrud as executive director and also including the Budget Board of the State of North Dakota and Governor Davis. The reasons and necessity of a new fee schedule were spelled out in detail for them, pointing out to them the increased cost of doing

business and the inflationary trend present in this country. Also, the fact that the last fee schedule had been negotiated in 1952 and put in effect in 1953 was emphasized. It was also suggested to them that the state medical association would be most happy to appoint a committee to work closely with them on the medical aspects of the welfare program in North Dakota. It was stressed, however, that, in the past, liaison committees had failed to function because a meeting had not been called by either party. It was suggested that if they adopted our proposal, this liaison committee should meet quarterly on a routine basis and should not be called at the discretion of any single party. It was also suggested that it meet with the entire Public Welfare Board at least once yearly to discuss their common interests and solve their common problems.

Our brief that was proposed to them on November 19 spelled out the conversion factor that we felt would be fair and equitable to all. The conversion factors were as follows: \$2.75 per unit for medical services, \$3.20 per unit for surgical services, and \$5.00 per unit for laboratory and x-ray services. A rather vigorous discussion developed after the presentation of this brief. At the time of the writing of this report on March 15, we have been informed by Mr. Onsrud, executive director of the Public Welfare Board, that our proposal had been tabled while the North Dakota Legislature was in session. We have stressed to Mr. Onsrud our need and desire for further consideration of our proposal by the Welfare Board prior to our state meeting on May 2, 1959. A delay in negotiations could be expected during January and February while the legislature was in session. That period has now passed, and we have every reason to expect the board to expedite negotiations at this time. Further information will be directed to the Public Welfare Board through Mr. Onsrud, asking for action on our proposal of November 19. It is our intent and purpose to have this successfully concluded by the time of the state medical association meeting on May 2, 1959, at Bismarck, or that specific recommendations will be made to the House of Delegates at that time for further action.

Workmen's Compensation Board. The negotiating team for the Medical Economics Committee also met the commissioners of the Workmen's Compensation Board in Bismarck in November 1958. We likewise asked them to adopt the relative value schedule in determining fees for physicians in North Dakota. Much discussion had resulted relative to this schedule at that time. The conversion factors that we proposed to the Workmen's Compensation Bureau were \$4.00 per unit for medical services, \$4.50 per unit for surgical services, \$5.00 per unit for laboratory and x-ray services. Since our initial meeting with the board, we have had no official report as to action taken. Likewise, because the legislature was in session, no further action could be expected. However, it is the intent and purpose of the chairman to have a further report for the House of Delegates on May 2, 1959. We believe favorable action can be expected from this board.

Veterans Administration. On November 29, 1958, a meeting was held in Fargo, with representatives from the Veterans Administration Hometown Medical Care Plan. The new fee schedule based upon our relative value schedule was asked of them on behalf of this association.

This schedule was forwarded to them one week later after further details were worked out. The local officials in Fargo, of course, have no authority and must forward this to the national office in Washington, D. C. However, on March 14, 1959, we received a telephone communication from the Fargo office stating that our sug-

gested fee schedule was unacceptable as proposed and that they had made many revisions. At the present time, this program is relatively small and involves very little money in North Dakota and is of importance to the state medical association and its members chiefly in setting a precedent for an adequate fee schedule. On March 14, at a meeting of the Medical Economics Committee in Bismarck, it was agreed that the Veterans Administration should be informed that its revised proposal to us was unacceptable and further negotiations with it were suggested. It is the recommendation of this committee that unless a suitable, fair, and equitable schedule can be arrived at by mutual agreements, this association should enter into no agreement with the Veterans Administration and that our physicians be informed that no fee schedule exists as far as our membership is concerned. We hope that this step will not be necessary and that eventually a satisfactory agreement can be made.

Indian affairs. On December 6, 1958, the negotiating team met the Indian Bureau representatives from Aberdeen, South Dakota, at Jamestown, North Dakota. Again we proposed to them the use of the relative value schedule in determining fees for our members in giving service to Indian recipients. Inasmuch as 90 per cent of the Indian population in North Dakota is under the care of the Indian Bureau of the United States Public Health Service and are apparently indigents, it was proposed that it accept the conversion factors that we had requested of the North Dakota State Public Welfare Board, namely, \$2.75 per unit for medical services, \$3.20 per unit for surgical services, and \$5.00 per unit for radiology and laboratory services. This agreement was finally negotiated and our conversion factors were accepted.

Vocational rehabilitation. Also, in November, 1958, preliminary negotiations were held with the Vocational Rehabilitation Unit of North Dakota regarding the fee schedule. It was indicated to us at that meeting that the Vocational Rehabilitation Unit was very much interested in the relative value schedule and would most likely be willing to pay the usual reasonable fee charged by physicians in North Dakota in private practice. Further phone conversations with them indicate that this continues to be their thinking. This agreement likewise is in the process of being completed.

Another full committee meeting of the Medical Economics Committee was held in Bismarck on March 14, 1959, at which the previous work of the negotiating team with the various state and national agencies was reviewed, and the entire committee approved of action taken up to this time. The major purpose of the March 14 meeting was to discuss Blue Shield schedules. We had received a letter from the executive director of Blue Shield stating that the Blue Shield Board had asked the Medical Economics Committee to make suggestions and to advise its board on what we felt would be satisfactory conversion factors under the relative value schedule as pertains to plans A, B, and the proposed plan C for the Blue Shield policies. There also was a lengthy discussion regarding coverage of individuals over age 65. After much discussion, the following conversion factors were proposed to the Blue Shield Board. Plan A provided \$2.75 per unit for medical services, \$3.20 per unit for surgical services, and \$5.00 per unit for laboratory and x-ray services. Plan B provided \$3.50 per unit for medical services, \$4.00 per unit for surgical services, and \$5.00 per unit for laboratory and x-ray services. Proposed plan C would provide \$4.50 per unit for medical

services, \$4.50 per unit for surgical services, and \$5.00 per unit for laboratory and x-ray services.

It must constantly be kept in mind when using these conversion factors that the entire schedule must be taken into consideration in order to determine the exact dollars and cents that any one procedure will pay. It is not the thought or the purpose of this committee to set a price for individual procedures unless the entire package of the relative value schedule is adopted by various agencies and by Blue Shield. A thorough understanding of relative values is needed. Some procedures will naturally result in a lower fee, some will remain the same, and some will increase. However, a careful study of the entire relative value schedule would indicate that the over-all fees should increase when all procedures are considered. As stated before, if this program is placed in effect, many inequities will be found in this schedule. It is imperative the Medical Economics Committee and the Blue Shield Board review this schedule at intervals and correct these inequities at definite periods when they arise.

As chairman of this committee, I wish to thank its members for their very close and intensive cooperation during this past year. I particularly wish to acknowledge the help, time, and cooperation of the negotiating team, which consisted of Dr. V. G. Borland, Fargo; Dr. E. J. Larson, Jamestown; Dr. V. J. Fischer, Minot; and Dr. J. H. Mahoney, Devils Lake. I am also indebted to Dr. A. E. Culmer, Jr., Grand Forks, who sat in as the orthopedic consultant on negotiations with the Workmen's Compensation Board.

I believe it would be of value to the House of Delegates to bring this report up-to-date on May 2, 1959.

C. H. PETERS, M.D., Chairman

REPORTS OF SPECIAL COMMITTEES

Committee on Mental Health

Your Committee on Mental Health had one meeting during the year on October 31, 1958, in Bismarck. The following members were present: Drs. H. C. Walker, Williston; E. G. Vinje, Hazen; M. W. Garrison, Minot; Phillip Berger, Grand Forks; John G. Freeman, Jamestown; and John H. Young, Jamestown. President O. A. Sedlak and executive secretary Lyle Limond were also present. It was the consensus that this committee would function primarily as a "sounding board" and in an advisory capacity to established "action" groups. The specific conclusion of the committee meeting included: (1) endorsement of a Children's Psychiatric Unit, (2) recommended study of decentralizing facilities for the care of geriatric psychiatric patients, (3) recommended in each general hospital a designated area for safe care of emotionally disturbed patients, (4) offered services of committee as professional advisory group to State Mental Health Association and recommended that this group sponsor a program of psychiatric education for physicians in private practice, and (5) offered services in an advisory capacity to the Commission on Alcoholism.

Your committee chairman also attended the fifth annual Conference of Mental Health Representatives of the state medical associations in Chicago, November 21 and 22, 1958. The program was very stimulating and included discussions on mental deficiency, communicability of mental and emotional illnesses, education for psychiatric medicine, Joint Commission on Mental Illness and Health, and mental illness and health in the aged. Dr. Gunnar Gunderson, president of the American Medical Association, spoke on "The Communicability of Mental and Emotional Illnesses," and Dr. Jonas Salk

spoke on the "Analogies Between Neurologic and Psychologic Phenomena." It is the goal of these meetings, sponsored by the American Medical Association Council on Mental Health, to bring mental health problems to a state level at which the state medical associations can be instrumental in improving mental health practices.

This has been a rather successful year for mental health problems in North Dakota. The 1959 legislature discussed at length the proposal for a children's inpatient psychiatric unit and, although it did not authorize money for the construction of such a hospital, it did appropriate sufficient money to establish outpatient clinic services. The general question of mental health and a mental health authority was referred to the Legislative Research Committee for study. The 1959 legislature appropriated \$1,000,000 for a revolving fund to grant loans to non-profit organizations to construct rest homes, nursing homes, and so forth, for the aged. The State Hospital offered a speaker's service for the county and district medical societies, and 5 societies accepted the invitation.

Dr. Saxvik's resignation as superintendent of the State Hospital was received. Dr. Saxvik contributed materially to improving the facilities and patient care at the hospital, converting the services from essentially custodial to a treatment center. He is entering psychiatric residency at the University of Nebraska.

JOHN H. YOUNG, M.D., Chairman

Committee on Veterans Medical Service

The Committee on Veterans Affairs did not meet during the past year, and no problems of any type were presented to the committee.

Insofar as is known, no veterans problems are pending.

A. C. FORTNEY, M.D., Chairman

Committee on School Health

There has been no official meeting of the School Health Committee. However, the chairman of the committee contacted each member by mail for any recommendations to be considered. It has been suggested that it might be wise to investigate and make recommendations concerning the physical requirements and protective equipment necessary for athletes in our colleges. This suggestion was prompted by accidents at our colleges and the death of a state college athlete.

Dr. E. J. Schwinghamer, of New Rockford, suggests the establishment of a standardized program of preparation for participation in high school athletics. "Coaches tell me that the boy who is most often hurt is the one who is not in good physical condition, and my own experience in the treatment of athletic injuries indicates that their opinion on this is correct. I think that there should be a minimum period of preparation before any team plays a game, even if this means delay in the start of the already short football season."

Dr. M. H. Poindexter, of the Fargo Clinic, suggests the consideration of routine tuberculin testing in schools. It has been done in Fargo in the past year, and he feels it has considerable merit.

The chairman of the School Health Committee suggests that any recommendations or criticisms for our school health program by any member of the state medical association be brought to the attention of the School Health Committee. No studies or improvements in our school health program can be made without the cooperation of the entire medical association.

R. W. McLEAN, M.D., Chairman

Committee on Diabetes

The Committee on Diabetes, initiated by Dr. Leonard Larson of Bismarck, has continued its primary function to encourage and coordinate annual diabetes detection drives throughout the state under sponsorship of constituent local medical societies. This function is a co-operative effort in support of National Diabetes Week, sponsored in November of each year by the Committee on Detection and Education of the American Diabetes Association, Inc. A trend of increasing participation is in evidence among district medical societies throughout the nation. Last year, well over 1,000 societies held individual detection drives.

In November 1958, detection drives were held by 2 district medical societies in North Dakota, namely, the Northwest District Medical Society and the Grand Forks District Medical Society.

In the case of the former, society testing units were distributed through drugstores in Minot and the surrounding communities. This way, the public could easily avail themselves of the free testing supplies, and 8,000 Clinistix units were distributed. The number of persons returning the testing units totaled 1,579. The results of these tests were as follows:

Thirty-six tests were positive for sugar, and only 1 of these proved to be that of a previously known case of diabetes. Of the 35 positives, 23 were considered to have adequate follow-up reports sent in from various physicians. The actual yield of previously unknown cases of diabetes was 7. This represents approximately $\frac{1}{2}$ of 1 per cent yield of actual new cases of diabetes. Considering the fact that 1,022 of the total tested were under the age of 44, that 511 cases were in the age group of 5 to 24, and, finally, that 102 cases were in the age group of 4 years or under, this is an excellent yield of previously unknown cases of diabetes.

The Minot drive was hampered by inadequate publicity and bad weather. It was reported that many people would not respond to personal letters asking to be further tested or to report results if further testing is done. However, the discovery of 7 new cases of diabetes more than justified the efforts expended in this drive, and Dr. Kenneth N. Amstutz is to be commended for his intensive efforts and for the results actually achieved.

In the Grand Forks detection drive, a total of only 780 tests were actually mailed in spite of the fact that some 3,000 Clinistix testing kits were distributed by the Jaycees. Of the total, 580 tests were negative and 24 were positive. It is of interest that 176 patients who had negative tests had a positive family history of diabetes. Unfortunately, only 11 of the positive tests were considered to have had adequate follow-up reports. Nevertheless, 2 previously unknown cases of diabetes were discovered. Efforts are still being made to solicit a follow-up report from the physicians involved in the remaining 13 cases.

The fact that 9 new cases of diabetes were discovered among 2,359 candidates certainly points up the fact that a detection drive is worthwhile even if response and final follow-up studies are not consummated to the satisfaction of the committee. While many of us have been opposed to having the Public Health Service carry out diabetes detection drives, it would seem feasible to ask district public health nurses to aid in follow-up of patients with positive cases who have not reported in to their physicians. This certainly would increase the yield significantly.

As mentioned in the committee's previous report, many district societies feel that a detection program carried

out once every two years is apt to be more successful. Nevertheless, the committee feels that we should not lose sight of the fact that diabetes detection is a year around problem, and the best detection drives probably have as their most useful objective the stimulation of public curiosity to be tested either during a drive or by their personal physicians at some time throughout the year. It is also well to remember that diabetes is definitely on the increase as evidenced by the statement of the Metropolitan Life Insurance Company that the rate of increase in the diabetic population will be 3 times as great as the percentage increase in the general population for the year 1985. It is hoped that more district societies throughout the state will see their way clear to conduct detection drives in the future.

I wish to take this opportunity to thank the following members on the Committee on Diabetes for their cooperation and continued interest in diabetes detection throughout the state: Drs. A. K. Johnson, Williston; P. Roy Gregware, Bismarck; Donald M. Barnard, Fargo; K. G. Foster, Dickinson; B. Hordinsky, Drake; Robert M. Fawcett, Devils Lake; Martin Hochhauser, Garrison; W. H. Wall, Wahpeton; and Kenneth N. Amstutz, Minot.

E. A. HAUNZ, M.D., Chairman

Committee on Foreign Trained Physicians

The foreign medical graduate continues to be a serious problem for most medical licensure boards in the United States, and this situation will probably continue for an indefinite period. While exact figures are difficult to obtain from the State Department, it appears that large numbers of these graduates continue to migrate to the United States each month. This has been facilitated by recently expanded immigration quotas and stimulated by the enthusiastic reports sent back by foreign graduates already established in the United States.

It is my opinion that the following figures will help explain the situation. About 7,000 medical students graduate each year from our 85 grade "A" medical schools. There are approximately 12,500 hospital internships which have been approved by the A.M.A. This leaves a deficit of 5,500 internships which cannot be filled with United States graduates. Therefore, it would seem we are either graduating too few physicians each year or have too many approved internships. This 5,500 internship deficit is incompletely filled by about 2,500 foreign graduates, and the 3,000 balance remains unfilled. Since a hospital must fill two-thirds of their prescribed quota within two years or lose their approved status, it can readily be seen that there must be great activity and even competition between hospitals to obtain their intern quotas. It has been stated that this situation has resulted in actual recruiting in foreign countries for interns, sometimes in collusion with foreign travel agencies who offer package deals and guarantee hospital positions in the United States.

About one year ago, the Educational Council for Foreign Graduates (E.C.F.G.) was placed in operation. This organization was originally the creation of the Federation of State Medical Boards, but, due to our limited finances, it was necessary for us to call on allied groups to assist us in its development. The participating groups were the A.M.A., The Association of American Medical Colleges, and the American Hospital Association. In order to perfect such an organization, especially from the tax angle, several years of construction were necessary.

The first examination was given in March 1958 and consisted of 400 multiple choice questions prepared by the National Board and completed in one day by applicants. The questions covered the usual subjects, al-

though only 10 per cent were allotted to the basic sciences. This was explained by the fact that many of the questions in the clinical subjects were so constructed as to require a detailed knowledge of basic science principles. At the first examination, 298 applicants were examined and 146 failed, a mortality of 49 per cent. This compares with a mortality rate of 65 per cent in New York and Michigan, 58 per cent in Illinois, and 48 per cent in California.

The second examination was given in September 1958, and the number of questions was reduced from 400 to 360, thus lowering the standards by 10 per cent. About the same mortality rate prevailed. There were 707 applicants, and 336 failed.

As a member of a state examining board, I was surprised that the mortality was so low, whereas the hospital association members were disappointed that the mortality rate was so high. Following this second examination, the hospital representatives were able to establish a group labeled "conditionally approved and eligible for temporary licensure." This group consisted of those whose marks ranged from 70 to 75 per cent. The creation of this group, in my opinion, represented a distinct lowering of the standards and was opposed by the Federation of Delegates on the Council. If such practices continue, this Council will no longer be of any value to most state boards as a screening agency. The present method of evaluating credentials by this Council is not completely satisfactory, since it sometimes accepts photostats rather than the original diplomas, and, due to difference in premedical education in many foreign countries, the Council is not always able to determine if premedical education has been adequate.

I wish to emphasize an important point, namely, that an E.C.F.G. certificate means only one thing, that such a foreign graduate has had about the same amount of premedical and medical training as the graduate of a United States medical school and has a workable command of the English language. It does in no way test his fitness to practice medicine or to apply his medical knowledge to the bedside. That is the responsibility and duty of each individual State Board to determine. This examination given in one day does in no way compare with or equal the five and one-half day test given by the National Board or the complex examinations given by specialty boards. I cannot emphasize this statement too strongly.

The Educational Council will surely fail in its purpose if it does not exclude those foreign graduates who do not meet our high standards of medical education. It is the solemn duty of all state licensure boards to accept only qualified physicians and to reject those who are not qualified, so that the American people will continue to receive the high type of medical service they are entitled to.

Last September, examination centers were established in 27 foreign countries, 10 in Europe, 7 in South and Central America, 7 in Asia, and 3 in the Near East. The purpose was to eliminate the unfit before migration to the United States. While the examination questions were prepared by the National Board, the security of the examination was in charge of the American embassies and consulates in these countries and how faithfully this important responsibility was carried out is, of course, not known. It is known, however, that in many foreign countries the honor system in examinations, as we know it, is not recognized and any method of passing is considered fair. Some of the reports which appear in the press concerning the way and manner in which billions of United States dollars have been wasted in foreign

aid, often under consulate and embassy control, makes one suspicious of their efficiency.

There are 9 states: Arkansas, Idaho, Montana, Nevada, Oregon, South Carolina, Utah, Vermont, and Wyoming, together with Puerto Rico, which do not accept foreign graduates under any condition. There are 27 states, 1 of which is North Dakota, which are using the E.C.F.G. as an agency to determine which foreign graduates have had the equivalent of medical education in United States Medical Schools. North Dakota will continue this practice as long as our Board is satisfied that the quality and standards of this examination are maintained at a high level.

The North Dakota Board has granted 444 licenses in the past ten years, 30 of which have been to graduates of foreign medical schools (Canadians not included). Fifteen foreign graduates have failed, which gives a mortality rate of 33 per cent. It would appear that this percentage is very low—perhaps too low. Twenty-six of these 30 graduates have been from European medical schools, 2 from the Near East, and 2 from Cuba.

The number of foreign graduates in the United States who are not licensed in any state is not definitely known since no figure can be obtained, but it is possibly around 10,000. It is known that 2,079 are serving in internships and 5,543 are in residencies. Total approved residencies number 25,000 plus. In addition, many are serving in state mental and tuberculosis hospitals. Twenty-two per cent of this number are women, and 25 per cent are in New York State. There were 1,525 foreign graduates licensed in the United States in 1957, and, while the 1958 figures are not available to date, it will likely exceed the 1957 number. Fifteen per cent of those were licensed by reciprocity.

State boards are concerned with the 2,000 United States citizens who are enrolled in foreign medical schools. Many of these persons were refused admission to medical schools in the United States because of deficiencies in their premedical education. When a substandard student graduates from a substandard medical school, the end product is surely substandard. These, then, will be processed as any other foreign graduate.

The North Dakota Board does not consider Canadians as foreign medical graduates; they are licensed by examination. During the past ten years, about 65 Canadians have been licensed and 5 have failed the examination. Unfortunately, about half of those licensed do not remain in North Dakota more than two or three years. We are attempting to correct this situation by granting a temporary license which does not become permanent until they have attained United States citizenship and have been in continuous practice in North Dakota for six years.

C. J. GLASPEL, M.D., Chairman

Committee on American Medical Education Foundation

North Dakota has made a very creditable showing this past year by increasing donations through the American Medical Education Foundation from \$2,549 in 1957 to \$4,080 in 1958, and, by adding the \$5,880 donated through alumni associations, we have a grand total of \$9,960.

Every year the program is meeting with more and more acceptance as doctors become increasingly aware of the needs of our schools. This past year, the national increase amounted to 15 per cent.

We may well be proud of our 85 class A medical schools now graduating close to 7,000 students per year. It is to our medical colleges that we turn when we seek

postgraduate study, yet all of us know that the modest tuition fee we pay does little to provide continuing staff support. This is but one of many reasons why we constantly remind you to make an annual donation through the American Medical Education Foundation. Although we have made a fine showing in the year just passed, we must realize that little more than 25 per cent of our membership is participating, and we should entertain prospects of a much better showing as our participants increase in number.

The Woman's Auxiliary throughout the nation again came in for their share of the credit, and that credit is growing by leaps and bounds. The Auxiliary this past year contributed \$113,540.56. Our hats off to them!

Each year other states are added to the list of those contributing through increased dues. This seems to me the best and most equitable way of handling the problem.

I herewith acknowledge letters from Dean Harwood of the University of North Dakota and from the College of Medical Evangelists in California, emphasizing the need for these funds and thanking you who have so kindly contributed.

W. E. G. LANCASTER, M.D., Chairman

Committee on Cancer

During the past year, your chairman had the pleasure of attending the first International Cancer Congress in London, a national meeting in New York, a district meeting in Denver, and several state and county meetings. Among the hundreds of papers presented at these meetings, nothing new was presented that would indicate that we are at the verge of a breakthrough in the cancer barrier. All of the investigators in cancer research simply appeared more advanced in their projects. More and more work is being done in cancer control. In addition to our scientific leadership, no other country has as many volunteers in the cancer control problem as has the United States. Other countries are continuing to look to us for leadership, and it is our duty to maintain our position of leadership in this field.

The American Cancer Society is in the process of presenting a vigorous campaign against cancer quackery. In spite of the fact that this campaign has been going on for many years in the past, it has not had proper guidance to present adequate legislation to the various states, enabling them to legislate medical bills with authority to stamp out cancer quackery. Due to the many loopholes in the law, medical examining boards are helpless in some instances to eradicate quacks. North Dakota is indeed fortunate that our examining board is alert to that problem, and quacks are few and far between. If we are able to present proper legislation in the future, we should be able to maintain our state entirely free of quackery, as I believe there is only one such person operating presently in the state. A bill with a good stiff fine and imprisonment enacted at this time would be a warning to any quack who has his eyes on North Dakota. An attempt will be made in 1959 and 1960 to reorganize our state cancer committee into a cancer commission. Organization on activities and duties of this commission will be outlined in detail, and it is our hope that this committee will be able to establish a state cancer advisory board and, if this act is approved by our state legislature, it will have the power to root out the quacks. We hope that we will have more information for you in our 1960 report.

A word about the controversy over Krebiosaen. Most of you undoubtedly have noticed that this controversy is again in front of the public, largely due to a book by Herbert Bailey entitled *A Matter of Life and Death*

(Putnam & Son, 1958). This book states that proponents of Krebiosa have made it clear that they wish to recoup from the sale of the substance, the investment claiming to be about \$2,000,000. They intend to sell the substance for profit as a proprietary drug. Despite this fact, they have repeatedly petitioned health organizations, such as the American Cancer Society and the National Cancer Institute, to underwrite a test of the therapeutic efficacy of Krebiosa in collaboration with them. However, they want tests of the substance made on their own terms. The chemical composition of Krebiosa remains unknown. In fact, Dr. Andrew Ivy stated that the process of manufacturing Krebiosa has not been revealed to him and that he has neither seen nor analyzed the original substance in the undissolved state. The recent claims of its therapeutic efficacy, which have been broadcast, are based on the case histories of patients treated with Krebiosa, although independent investigators have not been given access to these records in the last five years. At the present time, the National Cancer Institute, under the direction of Dr. Heller, has challenged the Krebiosa group and recently announced that the evaluation of Krebiosa is not underway and that the method of testing has not yet been agreed upon and cannot be determined until examination of data has been completed. Dr. Heller said, "Actually, we are now approaching the preliminary stage of examining the data submitted by Dr. Ivy to determine whether it warrants further investigation of the treatment." It is very interesting to note that 2 distinguished chemists, Dr. Paul Kirk and Dr. Arthur Furst, of the University of California and Stanford, respectively, testified at the 1958 hearings of the California General Assembly Committee on Public Health that they had independently attempted to extract and analyze Krebiosa. After the most exhaustive tests, Dr. Kirk independently concluded that extraction failed to reveal the presence of anything dissolved in the ampules and all that Krebiosa contains is mineral oil and nujol. Dr. Ivy has challenged this statement, although, as I stated before, he is unaware of the chemical contents. We will be happy to inform doctors in the future of the Krebiosa controversy.

Recently, Dr. John E. Gregory, physician of California, presented an antibiotic called Gregomycin, which he claimed to have discovered. He stated this has been effective in the treatment of human cancer. His claim is based on the theory that all human cancer is associated with the presence of a single virus, a possibility that no other person or institution has been able to establish. Assuming that human cancer is an infectious process identical with a few animal cancers known to be of viral origin, Dr. Gregory claims to have developed a vaccine which is effective in the treatment of cancer. The evidence concluded by the Cancer Commission lends no support to these claims, either of the role of a viral agent in the production of human cancer or to any established value for Dr. Gregory's method of treatment. Laboratory tests by qualified consultants indicate that Gregomycin has no antibiotic or antiviral activity and that it fails completely to control certain animal neoplasms which respond readily to chemotherapeutic agents of some established value.

A new type of cancer education will be presented to the various cancer societies this year. In addition to supporting cancer speakers for the North Dakota Surgical Society, the North Dakota Society of Obstetrics and Gynecology, and the state medical society, the North Dakota Division of the American Cancer Society presented a plan in which each medical society would be able to choose their own cancer speaker this year. All expenses

would be paid for the speakers. Williston, Dickinson, Bismarck, and Jamestown have chosen a continuation of the Cancer Caravan, and this year we will be favored by Dr. Martin Adson, of the surgical staff at the Mayo Clinic. Dr. Adson will speak on "Cancer of the Colon and Rectum." In addition, Dr. C. W. Harrison, surgical pathologist at the Mayo Clinic, will speak on "Exfoliative Cytology," as practiced at the Mayo Clinic. It will be interesting to note how this newer plan works out. Regardless of which plan will be permanently adopted, the objective of the Cancer Society is to introduce good cancer topics for our medical societies. We are also in the process of revising the topics of our Cancer Caravan speakers. We feel that, at times, we are presenting too much "cancer" to the doctors. We are hoping that in the future we may be able to present papers on other subjects which are closely allied with cancer.

Doctors in the various hospitals in the state are encouraged to help us in establishing our cancer registries. We realize that this is a huge task and will take considerable time, but, if the chiefs of staff will visit the medical librarians occasionally and discuss matters pertaining to the cancer registry at the staff meetings, it will be of tremendous help. We realize that the doctor today is being subjected to considerable detailed record work—in fact, too much. By means of a better understanding of the cancer registry, a greater part of this work can be eliminated and done by the hospital librarian and by the doctor's secretary. The time is not too far away when the establishing of a cancer registry will be necessary for accreditation.

The Cancer Committee is attempting to encourage added interest in exfoliative cytology. During the past year, a cytology committee of the North Dakota Cancer Society was established, and it is hoped in the future that a similar committee will be recommended to the state medical society for the permanent establishment of a cytology committee for the state medical association. Scholarships are being offered for any medical technician to receive a four months' extensive course in exfoliative cytology at the Mayo Clinic. Any doctor interested in encouraging his technician to take this course is advised to apply for an application with the North Dakota Cancer Society. To date, 2 applications have been received, and 2 have taken the course. It was noted that a four-day course in cytology was offered in Denver in the spring of 1958. Unquestionably, numerous opportunities will present themselves throughout the United States because of the increasing demand for this type of cancer detection.

A medical film, "Time and Two Women," is being presented to the various medical societies in North Dakota. This film was sponsored by the Public Information Committee of the American Cancer Society and is narrated and conducted by Dr. Joe Meigs, chief gynecologic consultant at Massachusetts General Hospital and Harvard University, Boston. This film is being shown to all medical societies before being shown to the public. It will not be shown in the areas without the approval of the local medical society. To date, approximately 24 showings have been presented in the state. This is a very fine film and should be seen by all doctors, as it presents the typical type of inquiries and questions that confront the doctor and shows methods of examinations which are available to date.

During the past year, the American Cancer Society conducted several area meetings in the United States for the express purpose of better acquainting the doctors of the United States with the program of the American Cancer Society. Those attending these meetings were cancer coordinators from various universities, patholo-

gists, members of the State Cancer Commissions, and cancer volunteers. Many constructive criticisms were presented at these meetings, but it was also satisfying to note that the present day methods of cancer education in North Dakota are well on a par with other states and, in some instances, advanced. However, one outstanding thing is noted in North Dakota in comparison with other states—a marked apathy and a lack of interest by the general practitioner in accepting our cancer education. Cancer is the doctor's problem. Cancer is the number two killer. We encourage the doctors in North Dakota to present talks on cancer subjects and to make their services available to the county commanders. Material for these talks is available at the office in Fargo. Very little preparation is necessary to present an adequate fifteen-minute talk on cancer. The biggest complaint that we hear from volunteer workers in the field is that the local doctors are not available for cancer talks. The future aim of the Committee on Cancer is to introduce and educate North Dakota doctors to the cancer program of "Cancer Education and Cancer Service."

CARROLL M. LUND, M.D., Chairman

Committee on Maternal and Child Welfare

The Maternal and Child Welfare Committee met in Jamestown on January 24, 1959. The committee submits the following for your consideration:

1. We recommend that the booklet *Resuscitation of the Newborn*, written by the American College of Obstetrics and Gynecology, be placed in every hospital in the state in which obstetrical deliveries are done. It may be obtained from the American College of Obstetrics and Gynecology and sent through the Maternal and Child Health Director of the State Department of Health.

2. We recommend that a team consisting of a doctor and nurse be sent yearly to the Cornell Medical Training Center for special instruction in care of the premature infant. This is a one-month course for nurses and a two-week course for doctors. The committee recommends choosing a team each year and that funds from the State Health Department be available to cover its transportation.

3. We recommend the use of the book *Standards and Recommendations for Hospital Care of Newborn Infants, Full-term and Premature* by the American Academy of Pediatrics be used in each hospital.

4. The immunization forms outlining the care of vaccination areas we feel are excellent for physicians and public health nurses to use. We recommend the following changes:

1. *Directions for care of the inoculation and vaccination areas.* The inoculation given to protect your child against diphtheria, whooping cough, or tetanus may produce a local reaction. This is usually improved by the third day. Very severe discomfort may be relieved by applying cold compresses. Vaccination is done to prevent smallpox. Proper care of the vaccination is important and will prevent complications.

A. Do not use any dressing or shield. Keep clean cotton long-sleeved shirt or blouse over vaccination area. Do not use clothes with tight sleeves which would bind the arm.

B. Wash hands thoroughly before and after handling the child. This will help prevent infecting the vaccination.

C. Bathing of child may be done as usual if the vaccination is kept dry and not rubbed.

D. Stages of vaccination: after three or four days, a little pimple will appear which, by the end of about a week, will become a blister and then redness will develop over a wide area. Gradually, the blister becomes crusted; the crust falls off after about three weeks. There may be some soreness in the glands in the armpit. If the blister should break, sponge carefully with rubbing alcohol and cover loosely with small, clean dressing.

E. If there seem to be any unusual effects, notify the family physician.

2. *Communicable disease control changes.* The rules and regulations of communicable disease control as followed by the North Dakota State Department of Health, were reviewed in scarlet fever and whooping cough. The following changes were recommended by the committee:

Scarlet fever (strep. sore throat) (page 22).

Regulation 41. Section 1. Isolation is required.

Section 2. Period of isolation. Isolation on the basis of recovery or not less than seven days from onset. May be removed after twenty-four hours of adequate treatment with penicillin provided therapy is continued seven to ten days.

Section 3. Isolation of exposed persons. Other exposed household members should be isolated for one week or for twenty-four hours with prophylactic penicillin treatment.

Section 4. Concurrent and terminal disinfection are required. (See regulations 26 and 27).

Section 5. Exposed person should not handle milk or other dairy products until released from isolation. *Whooping cough* (pertussis) (page 25).

Regulation 44. Section 1. Isolation is required.

Section 2. Isolation shall consist of separation of the patient from susceptible children and exclusion of the patient from school and public places for three weeks after onset of typical paroxysms. It is of particular importance to protect children at 2 years of age and below against contact with any other children with cough and fever of whatever origin and, especially, if whooping cough is suspected or is known to be prevalent. Isolation of children over 2 years of age is impracticable and, even in those under 2, it should not be insisted upon at the expense of fresh air in the open if weather permits. The communicable stage must be considered to extend from seven days after exposure to three weeks after development of the characteristic whoop.

Section 3. Isolation. Household contacts of children aged 2 years and under should be isolated and hyperimmune serum given to these infants. Although immunization to other household contacts below school age is not effectual, immunization programs should be stressed.

Section 4. Concurrent disinfection and a good clean-up of premises with soap and water and fresh air and sunshine should take place. (See regulations 26 and 27.)

Section 5. There are no healthy carriers of whooping cough.

CHANGES IN THE COMMUNICABLE DISEASE CONTROL PAMPHLET

<i>Disease</i>	<i>Principal way disease is spread</i>	<i>Incubation period</i>	<i>Period of communicability and exclusion</i>	<i>Control measures depend on recognition of disease and:</i>
Scarlet fever	Personal contact with a patient or by using contaminated milk and milk products	2 to 7 days	7 days after appearance of rash and until all abnormal discharges have ceased or in 24 hours with prophylactic penicillin therapy continued for 7 to 10 days	Report, isolate, and disinfect
Whooping cough	Personal contact with a patient	7 to 21 days, usually under 10 days	7 days after exposure to 3 weeks after development of paroxysmal cough	Report, isolate, and disinfect. Hyperimmune serum to all nonimmunized children 2 years of age and under

CHANGES IN SCHEDULE OF TREATMENT FOR PROTECTION AGAINST COMMON COMMUNICABLE DISEASES

<i>Biological</i>	<i>Ages</i>	<i>Dosage</i>	<i>Intervals</i>
Smallpox vaccine	Begin 3 months to 1 year	Multiple puncture	Vaccination should be repeated every 5 to 7 years
Triple immunizing vaccines	Begin 3 to 9 months	Follow recommended dosage	Reinforcing dose every 2 or 3 years (until of school age)
Diphtheria-tetanus (combined)	School age children	½ cc. 1st ½ cc. 2nd subcutaneous ½ cc.	1 month apart Booster every 3 or 4 years
Diphtheria toxoid (plain) or alum precipitated	Adults	Follow recommended dosage	1 month apart (subcutaneous)
Tetanus toxoid (plain)	Adults	½ cc. 1st ½ cc. 2nd ½ cc. 3rd ½ cc.	1 month apart 1 year after initial dose
Poliomyelitis vaccine	Infancy and adults	1 cc. 1st 1 cc. 2nd 1 cc. 3rd 1 cc.	4 weeks later 7 months later Booster every 2 years

ROBERT E. LUCY, M.D., Chairman

Committee on Crippled Children

A meeting of the Committee on Crippled Children was held in Fargo, December 13, 1958. Following is a résumé of this meeting:

1. Mr. William Unti, executive director of the North Dakota Society for Crippled Children and Adults of Jamestown, explained the present status of the Camp Grassick program. Several points were discussed, and it was felt that this was a very valuable resource of service to physically handicapped children in North Dakota and that the program should be continued and expanded wherever possible. All youngsters who could show improvement by the services provided should be considered for the opportunity to attend, and it is felt that local physicians in the state should be encouraged to make the necessary referrals so that the best selection of campers can be obtained for the maximum number which can be accommodated. It was suggested that a camping brochure with a cover letter should be sent to all physicians in the state prior to Camp Grassick sessions in the summer to remind them of the services available and for their cooperation. The value of the reports from Camp Grassick was discussed, and some physicians felt that complete reports should be continued but that condensation should also be available for those individuals who do not desire the complete reports. It was pointed out that the present handling of applications is through the County Welfare Board and that, if this is not desirable to some families, exploration of direct referral through the Easter Seal Society is to be carried out. Mr. Unti pointed out that it probably would not be possible to do this in the coming year until other arrangements

have been made. A request was also made from the Speech and Hearing Council, which is an affiliate of the North Dakota Society for Crippled Children and Adults, for an advisory committee to work with its council. After discussion, it was felt that this would fall more within the jurisdiction of the Academy of Otorhinolaryngology, and the matter was referred to the president of the state medical association, Dr. O. A. Sedlak, for further consideration.

2. Dr. Lindsay discussed the Fargo Opportunity School. He stated that the ages covered were 4 through 12 and that the school had ungraded classes for children with cerebral palsy, speech defects, and mental defects. He also stated that the Hillsboro School System had classes in special education. There is an exchange of records from these schools and the office of Crippled Children's Services in Bismarck. The medical panel of the Fargo Opportunity School can request information from Dr. Paul Johnson's office of the Crippled Children's Services.

3. Dr. Lindelow questioned whether bronchiectasis could be included under the conditions to be treated by Crippled Children's Services. It was pointed out that, at the present time, this is not included and that there are no plans to enlarge the scope of the program. It was further indicated that this should be done only in connection with the Medical Advisory Council of the Public Welfare Board as well as the Crippled Children's Committee as to whether or not such an inclusion would seem desirable. No definite action was taken.

4. Your chairman spoke on the breakdown of the several categories of Crippled Children's Services under

the Public Welfare Board. It was indicated that this program continues to show some expansion, most particularly within the field of eye surgery for strabismus, the surgery of congenital heart disease, and the orthodontic treatment for malocclusion.

5. Discussion was made about the present Crippled Children's Services regarding out-of-state referrals. It was felt that there should be no relaxing of the Crippled Children's Service's present policy of referring patients to specialists within the state of North Dakota when adequate treatment can be obtained from them and that out-of-state referrals should be continued only if such services do not appear to be adequate here within the state. It was further pointed out that this policy is applicable in most states and that in many states, such as Kansas, no child can be referred out of the state.

6. It was moved by Dr. Culmer and seconded by Dr. Hart that, from a medical standpoint, the proposed Children's Psychiatric Hospital should be located at the State Hospital in Jamestown. Motion was carried.

The chairman hereby wishes to express his thanks for the cooperation and excellent turnout and active participation of the members and guests. It is felt that this committee plays a very vital role and continues to be a very significant committee of the North Dakota State Medical Association.

PAUL L. JOHNSON, M.D., Chairman

Committee on Nursing Education

As to the report for the Committee on Nursing Education, no formal meeting was called for the year 1958 and 1959 because no apparent business or activity demanded such action. Continued contact with the executive office of the North Dakota State Nurses' Association has been maintained.

C. R. MONTZ, M.D., Chairman

Liaison Officer to the North Dakota State Dental Association

The liaison officer to the state dental association followed with interest its legislative proposals of the current legislative session and found no inconsistencies.

Contact with the secretary of the state dental society continued throughout the year, so that there was mutual cooperation between our societies on such national legislative programs as the Jenkins-Keogh bill and, currently, the Simpson-Keogh bill.

DAVID J. JAEHNING, M.D., Liaison Officer

Liaison Officer to the North Dakota State Bar Association

The third Medical-Legal Seminar or Conference was held on October 24 and 25, the first day at the University of North Dakota and the second at Bismarck. Three physicians and one attorney gave excellent papers. The turnout of physicians continues to be somewhat disappointing, although it was better this year than it has been at the two previous conferences. All efforts will continue to be made to develop programs of genuine interest and application so that an increasing number of physicians and attorneys will desire to attend. It is felt that this is a worthwhile project and that the North Dakota Bar Association should be congratulated on their efforts to develop and improve this type of a program. It is trusted that further programs will be forthcoming and will continue to be improved.

It is also desired to state here that a previously developed interprofessional code between the State Medical and State Bar Associations was accepted by the State Bar Association last year. It is felt that this is needed in

clarifying the individual responsibilities of our various members. It is realized that there are probable points which remain mute, and all efforts should be directed toward continuing to clarify and improve this code.

PAUL L. JOHNSON, M.D., Representative

Report of Representative to the Medical Center Advisory Council

The Medical Center Advisory Council met according to law on June 14, 1958, and January 3, 1959, both meetings of which your representative attended. Among the numerous items discussed, the following appeared to be of most importance.

The Ireland Research Laboratory, constructed from a private contribution and federal funds, is now practically completed and has been in use for a number of weeks at this writing.

As was reported one year ago, the Biochemistry Department was overloaded with requests from throughout the state for routine services, many of which could be performed in ordinary laboratories, so it was recommended to the Medical Center Advisory Council that fees be charged for many of their procedures on a cost basis because of the expense of operating the service and because of the numerous requests for procedures that could be done elsewhere. A fee schedule was drawn up and presented to the Medical Center Advisory Council which approved schedule and plan of procedure, and then the plan was approved by the State Board of Higher Education and has been in effect for some time. The tests done here are supposed to be chiefly those that cannot be done in ordinary laboratories.

The Rehabilitation Unit has now been in operation for a little over a year and had cared for a total of 72 patients by the time of our January 1959 meeting. This appears to be a very slow growth, and, while the patients had been referred from various physicians, state agencies, and insurance companies, it is apparent that things other than the facilities at present available are needed. These are as follows:

1. *Inpatient housing.* The lack of housing for handicapped patients has resulted in inability of the unit to accept a considerable number of patients who otherwise might have been cared for. We were advised about this by those in charge quite some time ago, but, to date, no decision has been made and no funds are available for providing housing for either adults or children. This would be a considerable undertaking, requiring housing, dining facilities, schooling facilities for some of the children, and the other usual requirements for an inpatient type of operation. It appears at this time that if the facility is to be a complete success, housing facilities will be necessary at some time in the future.

2. *Medical director.* The lack of a medical director who is fully qualified and versed in rehabilitation and its possibilities is probably also a definite handicap. Whether the budget and funds of the Medical Center would allow acquiring such a person at this time is in doubt, but it would appear to your representative that, if the Rehabilitation Unit is to be a success, such a director will be necessary.

3. *Consultation staff.* While well-qualified men in various specialties are available locally, none are on the formal staff of the Rehabilitation Unit. While we know that these men are available, their abilities have been sought only occasionally.

It appears to your representative that housing, a qualified medical director, and more formal staff organization are necessary before the Rehabilitation Unit can operate in a completely successful manner.

As of January 1959, applications for admission to the Medical School consisted of 60 applications from North Dakota residents compared with 52 last year, making a total of 91 applications so far this year. Thirteen had been accepted as of our January meeting.

Last fall, of the 43 students who were accepted, 6 were from out of the state. Two withdrew before school opened and 3 have withdrawn since that time, leaving a first year class of 38.

This year, there are 34 second year students to transfer, with 3 taking a year's research fellowship. No difficulty is anticipated in transferring the entire class to other schools. There has been no problem in transfer for a number of years, and none is anticipated in the foreseeable future.

In 1957 and 1958, the maximum of \$75,000 was loaned to 40 different students from the Medical Center Loan Fund ordered established by the legislature. In 1956 and 1957, the first year of the fund, \$60,150 was loaned. Nine students have borrowed the full \$2,500.

The last information to us indicates that, to date, only 1 physician has taken advantage of the funds available under the Psychiatric Training Bill passed at the 1957 session of the legislature.

The Nurses' training program of the University and Medical Center has been expanded since our last report. The Deaconess Hospital in Grand Forks is dropping its three year training program, and the student nurses in training will all be from the University School of Nursing. The plan of this school is primarily to train nurses qualified for teaching and supervising. It is too early to give an opinion as to how this new program will work and how fully it will be expanded or to venture an opinion as to its effect on the supply of nurses in this area.

The cost of operation of the Medical Center and its various programs has steadily been rising, including the cost of operation of the Medical School. The anticipated budget for the present year comes within about \$10,000 of the anticipated revenue, which is too close for comfort.

Some of this is due to the addition of the following programs during the past two years: the psychiatric training grant program, which has a current annual cost of \$4,800 a year but could have an ultimate annual cost of \$14,400; the nursing school expansion, which has a current annual cost of \$46,000 and an ultimate cost of \$78,000; the Rehabilitation Unit has a current annual cost of \$50,000 and the ultimate annual cost is expected to be \$35,000, providing the program is successful and the expected funds from patient treatment and examinations and other sources materialize; and the Medical Center loans to medical students, which has a current annual cost of \$75,000 and which is expected to have an ultimate annual cost of \$25,000 when fund repayments begin coming in. This latter, of course, is purely an estimate, and this decrease cannot be planned on.

With these costs and the regular operation of the Medical School and older services, the total budget will be about \$610,000 this year. The mill levy is currently bringing in about \$620,000 annually.

P. H. WOUTAT, M.D., Representative

Report of the Delegate to the American Medical Association

Your delegate was present at all sessions of the House during 1958. At the June session in San Francisco, he served as a member of the Reference Committee on Medical Education and Hospitals and continues to serve the association in other capacities. A complete report of

the transactions of the House may be found in various issues of the *Journal of the American Medical Association* and could be read with profit by all members of our association.

Dr. Louis M. Orr, of Orlando, Florida, was unanimously elected as president-elect for 1958-59. The 1958 Distinguished Service Award of the American Medical Association was awarded to Dr. Frank Krusen, of the Mayo Clinic. Special citations to laymen for outstanding service in advancing ideals of medicine were given to Mrs. Charles W. Sewell, of Otterbein, Indiana; and Govind Bhare Lal, distinguished science writer and Pulitzer Prize winner.

During the past year or more, there has been an extensive and active reorganization of the structure of the association. It is hoped that, eventually, this will result in much more efficient performance of the various activities so vitally necessary in these changing times. As a result of the reorganization plans, there have been numerous changes in its personnel. Among those who have left the association are Dr. Austin Smith, editor of the *J.A.M.A.*, and Dr. Frank Dickinson, former head of the Bureau of Medical Economics. For one reason or another, most of the previous members of the Washington office are also no longer with the association. Many doctors look with some misgiving on these drastic changes but feel that we should loyally support Dr. Blasingame, now executive vice-president of the association, and the Board of Trustees in their efforts to improve the services of the A.M.A. for the doctors and the people of this country. Among other changes, Dr. Edward L. Turner, formerly secretary of the Council on Medical Education in Hospitals, has been appointed director of the Division of Scientific Services; and Dr. Franklin Yoder, formerly of Cheyenne, Wyoming, is the new director of the Division of Socio-Economic Services.

Most of our members are well aware of the fact that the real problem confronting American medical practice today is that of third party intervention and control of such practice. Those of you who have read these annual reports will recall that this has been pointed out practically every year. The matter has been coming to a head in the deliberations of the House of Delegates, and, during the past year, 2 reports dealing with this subject have been presented.

A committee chairmaned by Dr. Lewis Alesen, known as the committee to study the A.M.A.'s objectives and basic programs, reported to the House of Delegates at the clinical session in Minneapolis. This report, which is abstracted in the *J.A.M.A.* of March 7, 1959, on page 1,077, says in effect:

1. The American Medical Association should reassert its leadership in medical affairs.
2. Closer liaison should be effected between the American Medical Association and special societies.
3. The purposes of the association should be redefined.
4. Continued study of developments in the socio-economic field is indicated.

Such studies are being carried out mainly through the Council on Medical Service. One such study is that of the relationship to the medical association of doctors who are not in private practice. A report on this aspect of the council's studies will probably be presented in June.

The second report, which deals specifically with the inroads of the third party control of medical practice, is that of the Commission on Medical Care Plans, which was reported at the Minneapolis session and laid over for consideration at the annual session next June. The report consists of a voluminous summary of insurance and other plans, with controversial items contained in the report of a subcommittee concerning lay sponsored and

unclassified plans for medical care. This report is composed largely of factual statements, that is, that lay controlled and closed panel plans for providing medical service are in active operation, and it points out various facts concerning their operation. The report further suggests that free choice of physician, while highly desirable, is not necessarily required for the patient to receive good medical care. Many doctors feel that this report, a copy of which is available through the executive secretary of the association, is mainly a statement of facts as they exist. Other doctors feel that the report goes much further than this and, to a considerable degree, approves of lay controlled, closed panel prepayment plans which deny the individual complete free choice of physician. There will, undoubtedly, be expressions of these various points of view at the June session. This subject has been assigned as the complete task of one reference committee, headed by Dr. J. S. DeTar, of Michigan.

At the Minneapolis session, considerable attention was given to the problems of the care of the aged. The following recommendation from the Council on Medical Service was approved by the House of Delegates:

"That the American Medical Association, the constituent and component medical societies, as well as physicians everywhere expedite the development of an effective voluntary health insurance or prepayment program for the group over 65 with modest resources or low family income; that physicians agree to accept a level of compensation for medical services rendered to this group which will permit the development of such insurance and prepayment plans at a reduced premium rate."

This program has been widely adopted and is being put into effect by Blue Shield plans and, to some degree, by commercial insurance companies.

The association is also carrying on many other activities in the field of the aged—notably, a national conference to be held in Washington in June.

Anyone who has noted the results of the election of last fall will realize that our legislative position has definitely been impaired by this election. There are, in the Congress, many more people who are indebted to, or believe in, the social philosophy of organized labor. It is readily apparent that the most effective influence on the type of legislation which will come out of Congress must be exerted before the representatives and senators are elected. It is not possible for the doctors or anyone else to exert effective influence merely by maintaining an expensive Washington lobby. If our point of view is to prevail, it must be expressed locally to our elected representatives and, preferably, to those who are running for office who are sympathetic to us and will appreciate our support.

The A.M.A. has been actively supporting the expansion of the Hill-Burton program, the provision of loans through the FHA to proprietary and other nursing homes, and the provisions of funds for research. It also is actively supporting the Jenkins-Keogh bill, now known as the Simpson-Keogh bill. It seems unlikely that this will be passed this year because of the administration's opposition. This opposition has developed because the administration does not wish to lose the revenue which would result from the passage of this legislation. There has again been presented to Congress proposals for complete socialization of medicine by Senator Murray and Mr. Dingle, and, more seriously, the Forand and other bills, which would provide for payment for hospitalization of social security recipients out of social security funds. It seems unlikely that the Forand bill will be passed this year, but there is an extremely grave danger of it being accepted next year, since 1960 is election year, and Congress tends to be most generous to voters just prior to election.

In summary, it may be said that your association is taking a very active position in regard to matters which deeply concern us. As may well be expected, violent differences of opinion are involved in taking a stand on such issues, and you will readily understand that this leads to unrest and difference of opinion among our membership. Expression of various opinions is a necessary part of the democratic process, but it is hoped that when a final decision has been reached, members will give their association loyal support.

W. A. WRIGHT, M.D., Delegate

NEW BUSINESS

Dr. Dodds, speaker of the House, introduced to the members of the House Mrs. V. J. Fischer, of Minot, president of the Woman's Auxiliary, who gave her annual report on the activities of the Auxiliary.

Mr. Speaker, members of the House of Delegates and guests: Thank you for this opportunity of presenting to you this report of the accomplishments of the Woman's Auxiliary for the year about to be concluded. I bring you cordial greetings from our members.

We have grown in numbers and stature in the twelve years of our existence. From the 163 charter members at the time of our organization, we have grown to 319 members. Our districts number 10, as do yours, and many of our committees parallel yours. We have looked to you for authority and guidance in our activities, and we are appreciative of the cooperation we have enjoyed from you, from Mr. Limond, your executive secretary, and from his staff.

We have carried out most of the objectives of the national auxiliary and have been very successful in certain areas of our endeavor.

As you know, one of the two fund raising projects which the auxiliary is engaged in is the Medical Student Loan Fund. The substantial sum of \$16,000, raised by district auxiliary projects and contributions, has been placed in this loan fund since its establishment in 1950. In his annual letter, Dr. T. H. Harwood, dean of the Medical School, reported that all funds were again used last spring and that 9 applications for loans were turned down because of lack of funds. It is apparent that, despite the passage of the bill providing loans from the Medical Center Loan Fund, there is a continuing need for our Medical Student Loan Fund. Dr. George W. Starcher, president of the University of North Dakota, asked that we consider increasing the provisions of our loan fund to include first and second year medical students, but it was the decision of the auxiliary to continue to grant loans to only third and fourth year students, as before, until such time when a larger sum of money is available in this fund.

The second and newer of our fund raising projects, the American Medical Education Foundation, was one of our priority projects this year. Our first contribution to A.M.E.F. made in 1955 was \$41. This year, because of increased interest and our A.M.E.F. Christmas card project, our contribution will be over \$800.

We have stressed the importance of acquainting the public with *Today's Health*, the American Medical Association's publication which carries authentic health articles for lay readers. We have used various means for promoting the sale of this publication. The North Dakota State Medical Association is to be commended for its decision to give 168 *Today's Health* subscription to our state legislators. Because of your gift subscriptions and the increased effort on the part of our district auxiliaries, our total number of subscriptions has increased from 144 in 1958 to 400 this year.

We are extremely proud of our newsletter. Through the efforts of our publicity chairman, editor, and committee, 4 outstanding editions of *News, Views, and Cues* were sent to all physicians' wives in this state. Included were articles prepared by various state chairmen, editorials, district news items, and the proposed revisions to our Constitution and Bylaws.

Several districts have very active recruitment programs which now include all allied medical careers in addition to nursing. The Future Nurses Club in one district meets every two weeks with programs planned to include speakers, recruitment films, and field trips. The girls put in many hours of volunteer work in their local hospital.

The Grand Forks District Auxiliary continues to maintain close contact with the very active Medical Student Wives Club at the University, which now has received its charter as an auxiliary to the Student American Medical Association. Through this means, we are fostering interest in the work of our auxiliary among these young women and grooming for us future informed and enthusiastic members.

Programs on mental health and safety were presented at several district auxiliary meetings, and when a definite civil defense program is available, our state and district chairmen are prepared to cooperate and put it into action.

With current legislation threatening our American system of free enterprise, your financial support of the American Association of Physicians' and Surgeons' essay contest, which we are promoting, is timely and appreciated. The cash awards which you made possible have been presented to three state winners. This contest is aimed at encouraging young people to think and write on: "The Merits of the American System of Free Enterprise" or "The Advantages of Private Medical Care." It, unfortunately, does not have the support of some of the high school principals because it is not on the list of contests approved by the National Association of Secondary School Principals. Application for placement on the approved list was denied because of: (1) controversial nature of topics, (2) failure to agree on a single uncontroversial topic, (3) inadequate amount of awards, and (4) unwillingness of the committee to endorse new essay contests. Our district chairmen have worked diligently on this program, and, despite the lack of support from some school principals, the number of entries increased this year.

Our Constitution and Bylaws has been completely revised this year and patterned after the newly revised Bylaws of the national auxiliary. Our Board of Directors approved the revisions at its fall meeting in September 1958, and the convention will act on them at this thirteenth annual state meeting.

With the many bills having medical interest both at national and at state levels, 704 in the first session of the 85th Congress and 50 during the 36th assembly of the North Dakota Legislature, which ended recently, legislation has been one of our prime concerns. Visiting the district auxiliaries has given me an opportunity to discuss the various bills under consideration and to emphasize particularly the dangers of the Forand bill, which would provide hospitalization for 13 million OASI recipients and restrict the choice of physician. The words of a man of wisdom, "Any government which is big enough to give you everything you need is big enough also to take everything away," sound a note of warning. We take for granted our four freedoms—just as important is the freedom of choice which would be denied us under this bill. We stand ready to give you our assistance.

We are a community service group, and each of us has made a large contribution in time and effort on local community activities.

One of the objects of the Woman's Auxiliary is "To participate in any endeavor on the request of the North Dakota State Medical Association." We count it a privilege to work as your auxiliary, and we hope to serve you well.

Speaker Dodds thanked Mrs. Fischer and called for further new business.

Mr. Don Eagles, the director of Blue Shield, requested permission to address the House. This request was granted, it being the feeling that a report to the House of Delegates from Blue Shield would encourage better public relations.

MR. EAGLES: Thank you, Dr. Dodds and members. It is indeed a pleasure and I deem it a distinct honor to appear before you people here today. Working in Blue Shield, we wonder sometimes how it is that the doctors give as much time to the organization as they do. However, we, in the organization, always think of it as the doctors' plan. I would like to talk a little about the progress of the North Dakota Blue Shield and give you a few figures for the past year.

Last year, the enrollment was 173,000 in North Dakota. In the country as a whole, 142,000,000 people were carrying Blue Shield, North Dakota was ahead of Minnesota, South Dakota, and Wisconsin in so far as the percentage of population covered was concerned. I think it is an honor that the doctors in the state have had the plan grow to that level. Our financial assets are one-third of a million dollars and added to that is a quarter of a million dollars in reserve. When we deal in subscriber income, a quarter of a million dollars does not seem so much to have as a reserve. A recommendation has been made that we build up a reserve of three months' claim payments and overhead administrative expenses for adequate protection to both the doctors and the public. Last year, we ended up with some two and one-half months' reserve. We are about one-half month's away from the requirement. In North Dakota last year, \$1,974,000 were paid by way of benefits to doctors of medicine. That breaks down to \$5,000 paid to each doctor in North Dakota if all the doctors received the same amount from Blue Shield. In the country as a whole, Blue Shield paid over \$500,000,000 to the medical profession.

Summarizing some of the new contracts and some of the new projects that the Board of Directors took action on last year, one of the most important was the elimination of the age limit of 65 years for applicants in Blue Shield. We should recognize the fact that people over age 65 require health care as much or more than younger people. And, as you know, agitation has brought this matter to a head. North Dakota was one of the first to provide a program for senior citizens. This assures the people also that the contract cannot be pulled. All the contracts are guaranteed to continue as long as the people pay the premiums.

Another contract developed was the extended coverage contract, which extends the benefits that are limited in the basic contract. As an example, one hundred twenty days of in-hospital care has been extended to cover two years for the catastrophic cases. One thing I would like to point out is that Blue Shield takes care of some 30 or 40 per cent of the medical calls of the public.

There is some controversy as to whether Blue Shield should expand. The demand on the part of the public

and others is such that we feel we should add, as we can, these benefits that are not in the present contracts.

One point that was resolved last year was the certificate of income for Plan A or Plan B. We know that there are people who are in Plan A who have incomes more than \$3,600 per year. We have in effect now the requirement that Plan A contract be sold only to people who certify that their income is less than \$3,600 per year. If their income is more, they must take Plan B or the plan for the higher income group. The number of contracts that are in force in Plan B is some 57 per cent of our total membership; Plan A has 43 per cent. We are attempting by all means that we have under our control to up these contracts; that is, to change the contracts of these people with a lower benefit contract to a higher benefit contract.

One program that has received a lot of study and is coming to an end is a study in the change of our present fee schedule to the relative value fee schedule, suggested by the North Dakota State Medical Association. In a meeting with Dr. Peters, chairman of the Medical Economics Committee, we had a fine discussion and arrived at a conversion factor for Plans A and B. To implement this plan schedule, we will have a meeting of the Board tomorrow, and we hope that final action can be taken so that we can introduce this schedule by the end of the year. Personally, I think this relative value fee schedule, if it goes through, will improve the fee schedule paid to doctors on an equitable basis.

There were several other changes discussed. One was to equalize the scope of benefits between Plans A, B, and C. The scope of benefits would mean that the benefits would be the same for each plan, particularly diagnosis, x-rays, and radiotherapy, the difference being the level of fees paid for such benefits and the premiums paid by the subscribers. The reason for this would be to eliminate any competition between the contracts. The scope of benefits would be equalized. One other point that is important is to add pathology and diagnostic x-ray on a deductible basis to all these contracts. Pathology has not been included as a benefit. It is the only field of benefits in the plans not paid for by Blue Shield. This probably would result in some future changes requiring adjusted rates to the public. The amount of adjusted rates required would range from \$.30 to \$.90 a month. I am sure the public would pay this, and it would result in a finer contract and a higher level of benefits to the subscriber and to the doctors.

I would like to talk to you a little bit about the national program. These are some of the ideas picked up at the annual meeting of Blue Shield. You all know of the Forand bill. Chances are about 50 per cent that this will go into effect. The chances are a lot greater that hospitalization will be included under the social security setup. I think it is up to the hospitalization policies to provide some care for people over the age of 65. I do not see why something cannot be worked out. The fact that they are older does not mean that they are worse risks than a younger person. You can pick men younger than 65 who are much more liable to need the services of doctors.

There are many special interest groups in our country today. I think the type of provision benefits that Blue Shield tries to develop is of concern to us. These groups, possibly employees of departments of welfare, would like to have services that are not provided and they suggest some unrealistic goals. They say that Blue Shield does not have everyone covered and that the government could supply everyone with hospitalization. They say that the cost of Blue Shield, Blue Cross, and

other insurance plans is too high today and that cost would be less through the government. We had an annual meeting of Blue Shield plans about three weeks ago. Some people were there who are quite close to Washington and to the American Medical Association. They said that socialized medicine is closer today than it was many years ago. It was not said as a threat, but was said, I think, as a feeling of hope that we could continue to fight socialized medicine. If we continue to fight it, it may be forestalled for the time being. In the Federal government, there is only one group which does not have some type of hospitalization, and that is the Federal employees. They will not give this group any coverage. Blue Shield plans feel that there should be a free choice among the government groups and that all carriers should be allowed to offer a plan. We feel that the government should contribute to the cost and have payroll deduction plans for the payment of premiums.

Future needs are a continued improvement in coverages offered to the public and a conservative use of Blue Shield, Blue Cross, and other hospital insurance plans. After all, it is your plan. Blue Shield will not tell you how to practice medicine and whether or not it is abused. We need conservative use of hospitalization. I feel very definitely that there must be direct control of the Board of Directors. We have been criticized that Blue Shield has been controlled by the doctors, but I think it should be controlled by those who bear the responsibility. I think that doctors should accept Blue Shield as their plan. We hope that in the future we can show that Blue Shield means that socialized medicine will not be foisted on the medical profession.

Speaker Dodds thanked Mr. Eagles for his presentation of the Blue Shield activities.

He next presented Mr. Ed Boerth, who summarized the activities of the Malpractice Plan during the past year.

MR. BOERTH: I am sure that you are familiar with the history of the Malpractice Insurance Plan. We appeared before the Council in December 1957 and presented this plan and stated why we feel there is a need for it and why it should be beneficial to the doctors of the state. It was tabled at that time, and we were asked to appear before the Council in Minot in 1958. The Council gave us permission to conduct a survey regarding the interest in this program. We did this, and the reports were very encouraging. Consequently, on November 30, 1958, in Minneapolis I appeared before the Council again and presented the survey. The Council approved the percentage of the plan and approved our going ahead and writing it. We have written some of it, but it has not been as good as the reports indicated at the time of the survey. Either the doctors were not sure or the answers were inaccurate.

It was my impression from the Council meeting in Minneapolis that this action would be taken back to the individual districts. My comment would be given to the districts and the plan endorsed in that manner for the district's approval. I understand that 3 medical districts have gone on record of approving the plan. This is not something that the doctors will be pressured about. If the doctors want this, we will be more than willing to write this up. If they approve, it will succeed. If not, it will not succeed.

I believe that such a plan is beneficial and advantageous to this group. I am sure most of you are aware of the articles that have appeared in the *Saturday Evening Post*. I think those articles hit the nail on the head. It has come out before the public, and malpractice is a

problem, perhaps not quite as much in North Dakota as in other parts of the country. There are insurance companies pulling out of malpractice underwriting. We found it very difficult to find a company to underwrite malpractice insurance. It has been very unprofitable for insurance companies.

The advantage is this: there are published rates per state; each state is rated, of course, as to exposure. Such information is published, and all companies will use it in order to regulate their own rates in the state. Malpractice insurance requires a plan that all the doctors will approve and endorse for the state. To obtain an initial premium and rate discount, the whole state group through the association will have all their insurance through one company so that, if one or two years are bad for claims, that company can afford to stay in this business. That is what has transpired since November in Minneapolis. Are there any questions?

Dr. Haunz asked for information regarding the size and rating of the company assuming coverage for the plan.

MR. BOERTH: It is not one of your top ten. It does have an A rating, which is an excellent rating. I talked to the vice-president of the company and he assured me that there would be no problem in writing this insurance. I am sure they are big enough to handle any losses which come up. Sometimes, these insurance companies reinsure with other companies, thereby spreading out their insurance.

Dr. Erenfeld asked what percentage was needed of the doctors in North Dakota to put this into effect.

MR. BOERTH: When we appeared before the Council we stated that to make such a plan succeed, both from the association and the company's standpoint, it would be necessary to set some goal. In our original meeting in December, 1957, we agreed upon the figure of 25 per cent at the end of the first year, 50 per cent at the end of the second year, and 75 per cent at the end of the third year. This is advantageous to the insurance company and also to your association because if such a plan is to succeed, both groups want a majority of the doctors to participate in the plan.

Participation has been good, but it could be much better. I think we could go way over the end of the first year figure. However, as participation is not reaching which is considered par, my partners considered it advisable to rent a booth at the Scientific Exhibits so that you may ask any questions regarding the plan. Maybe the reason why some of the doctors have not participated is because they do not know enough about it.

Speaker Dodds thanked Mr. Boerth for his report and stated that if there was any other action required, the House would take it.

The Chair next called upon Dr. Peters, chairman of the Economics Committee, who gave a supplementary report to that contained in the Handbook.

Following Dr. Peters' report, Speaker Dodds next introduced Mr. Carlyle Onsrud, executive director of the Welfare Board.

MR. ONSRUD: I know that there is concern about the relative value schedule. I know that as far as the public welfare program is concerned, generally speaking, the 53 counties would like to have a more orderly procedure in our relations with the medical association. As Dr. Peters mentioned last fall, Mr. Atkins met the members of the Medical Economics Committee, and, for the first time, we were introduced to the relative value fee schedule. I told both our staff and the Medical Economics Committee that my reaction as an administrator was that it was the right approach. It represents order and an

approach. We told the committee that we would go to the State Welfare Board and present this schedule, but that we did not know all its implications. We looked it over from the standpoint of cost. Mr. Atkins and other members of our staff looked it over in terms of the services of the regrouping, coding, and so forth. It was my understanding that the points set up at that time were those which the North Dakota State Medical Association felt we should strive for. Our group figured up the costs on that basis. The cost looked inordinate in terms of assistance and in view of our budget. We had this assessed by our Division of Child Welfare. They had a little easier time of it as that is a state operated program. This is state supervised and state administered. The whole Board met with the Governor and the Medical Economics Committee. I think we had a very good meeting. Dr. Peters and Dr. Larson did a very fine job. After this was over, the State Welfare Board at that time said, "We do not think we can afford to recommend acceptance right away." I indicated their stand to Dr. Peters. He was gracious enough to say that if we requested it, a representative from the state medical association might go with us to the appropriations committee to ask for greater funds. We had already been to the State Budget Board, and I was informed that they did not want the State Welfare Board to return for more funds. I think that we would have accepted your offer, but I think that there is some danger in overbidding your hand for money. We got what we asked for. It included extra money for raising fees for doctors as well as trying to figure in increased incidence in cases.

I think our Board sincerely felt that it did not want to get into the relative value schedule at this time. It is possible that if the points had been taken up last October, it might have become involved in it because it was a new appropriation. I think that the reason the Board turned it down was an unwillingness to become involved in untried areas.

We have had a base in North Dakota that most states do not have. We have been able to see that all people receive adequate medical care and, by and large, that they have free choice of physicians. As to the relative value schedule, I would like to see an approach made which would break down the inhibitions which have arisen through lack of understanding, so that the medical profession and the State of North Dakota could conclude that the relative value schedule, which is untried, will not develop a lot of difficulties. I think that we need your help and that we can help you in the areas in which you have inhibitions. I do promise full cooperation and full sympathy with what you are trying to do and ask you to help us out. Thank you very much.

Speaker Dodds thanked Mr. Onsrud for his report and asked if there were any question relative to Mr. Onsrud's talk.

Dr. Nugent inquired as to the objection to the relative value schedule, to which Mr. Onsrud replied: "The only explanation I can make is that the Welfare Board thought that it should not try out this relative value schedule first."

Dr. Baumgartner inquired what jurisdiction the State Welfare Board has over the county welfare boards, and Mr. Onsrud replied that it supervises the administration.

The next order of business was the announcement of the Nominating Committee. Secretary R. D. Nierling announced that members of the Nominating Committee are: Dr. Robert Tudor, chairman; Dr. Frank Melton; and Dr. V. J. Fischer.

Speaker Dodds next read a resolution that was referred to the House by the Council.

RESOLUTION

Whereas, the House of Delegates of the American Medical Association has asked each component medical association to answer two questions:

1. Free choice of physician. "Acknowledging the importance of free choice of physicians, is this concept to be considered a fundamental principle, incontrovertible, unalterable, and essential to good medical care without qualification?"

2. Participation in closed panel systems. "What is, or will be your attitude regarding physician participation in those systems of medical care which restrict free choice of physicians?"

And whereas, these questions were raised because of the report of the American Medical Association Commission on Medical Care Plans which was submitted to the American Medical Association Delegates in Minneapolis in December, 1958,

Now, therefore, be it resolved that the House of Delegates of the North Dakota State Medical Association go on record as stating that it is in sympathy with the report as a whole and that a letter to this effect be sent to Dr. L. W. Larson, chairman of the American Medical Association Commission on Medical Care Plans and to Dr. F. J. L. Blasingame, executive vice-president of the American Medical Association.

Dr. L. W. Larson discussed the preceding resolution and explained it to the House.

Speaker Dodds thanked Dr. Larson and stated that the resolution would be referred to the Committee on Resolutions.

He next read two more resolutions that had been referred to the House by the Council and which were referred to the Resolutions Committee.

RESOLUTION

Whereas, the primary interest of the North Dakota State Medical Association is the best possible medical care for the citizens of North Dakota,

Now, therefore, be it resolved that the North Dakota State Medical Association recommends that the superintendent of the state institutions for patient care at Dunseith, Grafton, and Jamestown be a qualified doctor of medicine.

RESOLUTION

Whereas, the North Dakota Board of Administration is charged with the management of several of our state institutions, operations of which involve problems of a medical nature, and

Whereas, the North Dakota State Board of Administration does not have, at present, an advisory committee on medical problems,

Now, therefore, be it resolved that the president of the North Dakota State Medical Association shall, upon request by the North Dakota State Board of Administration, appoint a liaison committee to assist and advise that Board in matters of a medical nature which may come under its jurisdiction.

Adjournment

There being no further new business to come before the House, it was moved and seconded that the first session of the House of Delegates adjourn to reconvene at 1:30 P.M. on Sunday, May 3, 1959. Time of adjournment was 6:00 P.M.

PROCEEDINGS

Of the House of Delegates

Of the North Dakota State Medical Association Seventy-Second Annual Meeting, Second Session

The Second Session of the House of Delegates was called to order by Speaker Dodds at 1:30 P.M., May 3, 1959, at the Prince Hotel, Bismarck.

The Chairman of the Credentials Committee, Dr. Robert Tudor, reported that there was a quorum present. Secretary Nierling called the roll and the following delegates responded:

Drs. Arthur C. Burt, Fargo; Elmer Beithon, Wahpeton; F. M. Melton, Fargo; F. DeCesare, Fargo; L. G. Pray, Fargo; H. A. Norum, Alternate, Fargo; William R. Fox, Rugby; D. W. Palmer, Alternate, Cando; E. A. Haunz, Alternate, Grand Forks; G. L. Countryman, Grafton; R. E. Mahowald, Grand Forks; Welde W. Frey, Alternate, Drayton; F. R. Erenfeld, Alternate, Minot; F. D. Naegeli, Minot; V. J. Fischer, Minot; A. F. Hammargren, Harvey; M. W. Garrison, Minot; Neil A. MacDonald, Valley City; M. A. K. Lommen, Bismarck; R. B. Tudor, Bismarck; Milton Nugent, Bismarck; Carl Baumgartner, Bismarck; Edmund Vinje, Hazen; J. N. Elsworth, Jamestown; J. M. Van Der Linde, Jamestown; D. R. Strinden, Williston; R. F. Gilliland, Dickinson; Keith Foster, Dickinson; R. W. McLean, Hillsboro.

There were twenty-nine delegates and alternates present.

Also attending the meeting were

Doctors T. E. Pederson, K. Vandergon, R. Leigh, R. H. Waldschmidt, A. R. Gilsdorf, V. G. Borland, G. W. Toomey, R. W. Rodgers, J. C. Fawcett, E. H. Boerth, D. J. Halliday, C. H. Peters, L. W. Larson, E. J. Larson, W. Wright, G. Christianson, J. D. Craven, and Lyle Limond.

There being no objection, the reading of the minutes of the first session of the House of Delegates was dispensed with.

The first order of business was the report of the Reference Committee to consider the Reports of the President, Executive Secretary, Secretary and Treasurer.

Dr. Fox, Chairman, presented the following reports and their discussions, which were adopted section by section and as a whole:

1. *Report of the President:* The Reference Committee agrees with the president's remarks that the public become aware of the problems facing medicine and also be informed as to how these problems are being solved.

The Committee heartily agrees with the president when he congratulates the Medical Economics Committee for formulating a Relative Value Fee Schedule as a basis for negotiation with the Indian Bureau, Workmen's Compensation Bureau, and the Welfare Board.

They concurred with the president when he congratulated the Legislative Committee on its fine work during the recent legislative sessions, and hoped they will continue.

They noted with interest the president's remarks referable to the Blue Shield, Cancer Society and the Journal-Lancet.

The Committee strongly commended Dr. Sedlak for his able and industrious accomplishments in behalf of the North Dakota State Medical Association during the past year.

This portion of the report was adopted.

2. *Report of the Secretary.* The Reference Committee reviewed the secretary's report and noted that the Association gained five new members to a total of 433 members for 1958. The secretary also urges early payment of dues before March 1st.

The Reference Committee commended Dr. Nierling for his excellent work as secretary.

This portion of the report was adopted.

3. *Report of the Executive Secretary.* The Reference Committee reviewed the report of the executive secretary and commended Mr. Limond highly for his efforts on behalf of the Society. They agreed with Mr. Limond in his "Thoughts for the Future" in which he urged greater interest in the problems of the aged; in the area of mental health; in the field of medical economics; the securing of a medical doctor as Director of the Public Health Department, and the planning for the Association's Diamond Anniversary.

This portion of the report was adopted.

4. *Report of the Treasurer.* The Reference Committee studied the report of the treasurer, Dr. E. J. Larson, and commended him for his excellent management of the Association's funds.

This portion of the report was adopted.

The motion was made by Dr. Fox and seconded by Dr. Baumgartner that the report be adopted as a whole.

W. R. FOX, M.D., Chairman
D. R. STRINDEN, M.D.
H. A. NORUM, M.D.
J. M. VAN DER LINDE, M.D.
M. A. K. LOMMEN, M.D.

Reference Committee to Consider the Reports of the Council, Councillors and Special Committees

Dr. Robert Tudor, Chairman, presented the following reports and their discussions, which were adopted section by section and as a whole:

1. *Report of the Chairman of the Council.* The Reference Committee reviewed the report of the Chairman of the Council and approved it. They believe the Council should be commended for its work during the past year.

This portion of the report was adopted.

2. *Reports of the Councillors.* The Reference Committee reviewed the reports of the councillors, and commended the councillors on their activities during the year and their very fine reports.

This portion of the report was adopted.

3. *Report of the Committee on Mental Health.* The Reference Committee reviewed and approved the report of the Committee on Mental Health.

This portion of the report was adopted.

4. *Report of the Committee on Veterans Medical Service.* The Reference Committee reviewed and approved the report of the Committee on Veterans Medical Service.

This portion of the report was adopted.

5. *Report of the Committee on School Health.* The Reference Committee reviewed the report of the Committee on School Health and approved of the report.

This portion of the report was adopted.

6. *Report of the Committee on Diabetes.* The Reference Committee reviewed and approved the report of the Committee on Diabetes.

This portion of the report was adopted.

7. *Report of the Committee on Foreign Trained Physicians.* The Reference Committee reviewed and approved the report of the Committee on Foreign Trained Physicians, and commended the work of Dr. C. J. Glasgow.

This portion of the report was adopted.

8. *Report of the Committee on American Medical Education Foundation.* The Reference Committee reviewed the report of the Committee on American Medical Education Foundation and approved of this report.

This portion of the report was adopted.

9. *Report of the Committee on Cancer.* The Reference Committee reviewed the Report of the Committee on Cancer and approved of the report.

This portion of the report was adopted.

10. *Report of the Committee on Maternal and Child Welfare.* The Reference Committee reviewed and approved of the report of the Committee on Maternal and Child Welfare.

This portion of the report was adopted.

11. *Report of the Committee on Crippled Children.* The Reference Committee reviewed and accepted the report of the Committee on Crippled Children.

This portion of the report was adopted.

12. *Report of the Committee on Nursing Education.* The Reference Committee reviewed the report of the Committee on Nursing Education and approved it.

This portion of the report was adopted.

13. *Report of the Liaison Committee to the North Dakota State Dental Association.* The Reference Committee reviewed this report and approved it.

This portion of the report was adopted.

14. *Report of the Liaison Officer to the North Dakota State Bar Association.* The Reference Committee reviewed this report and approved it.

This portion of the report was adopted.

Dr. R. B. Tudor moved the adoption of the report as a whole, seconded by Dr. Beithon, and carried.

R. B. TUDOR, M.D., Chairman
R. F. GILLILAND, M.D.
ELMER BEITHON, M.D.
D. W. PALMER, M.D.

Reference Committee to Consider the Reports of the Delegate to the American Medical Association, Medical Center Advisory Council, and Committee on Medical Education

Dr. Keith Foster, Chairman of this committee, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. *Report of the Committee on Medical Education.* The Reference Committee commended the Committee on Medical Education for the work done within the past year, and for the support given to our medical school. They noted, however, with alarm, the decreasing number of applicants for admission to medical schools throughout the United States.

The Committee believed that this fact deserves further reconsideration of our State Association.

This portion of the report was adopted.

2. *Report of the Representative to the Medical Center Advisory Council.* The Reference Committee wished to thank Dr. Woutat for his long service to the Association, as our representative, and concurred on his recommendations in regard to the Rehabilitation Center.

This portion of the report was adopted.

3. *Report of the Delegate to the American Medical Association.* The Reference Committee reviewed this report with interest. They commended Dr. Wright on his work as our delegate and for his report to our House of Delegates.

This portion of the report was adopted.

Dr. Foster moved the adoption of the report as a whole, seconded by Dr. Mahowald, and carried.

KEITH FOSTER, M.D., Chairman
L. G. PRAY, M.D.
R. W. McLEAN, M.D.
M. W. GARRISON, M.D.

Reference Committee to Consider the Reports of the Standing Committees

Dr. Baumgartner, Chairman, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. *Report of the Committee on Necrology and Medical History.* The Reference Committee reviewed the report of this committee, realizing what a great loss this Association has suffered in the death of three of our most prominent men in the past year; namely, Dr. Nels Tronnes, Fargo; Dr. Howard B. Huntley, Kindred; and Dr. Leonard H. Fredricks, Bismarck.

Through a lifetime of selfless labor, these men have helped to raise the standards of medicine in North Dakota, and they so lived their lives as to make them an inspiration to every physician. Their departure from our midst is most regrettable, poetically expressed in this verse by Hilda Butler Farr:

People come into our lives
And walk with us a mile,
And then because of circumstance
They only stay a while.
They serve a need within the days
That move so quickly by,
And then are gone beyond our reach,
We often wonder why.
God only knows the reasons that
We meet and share a smile —
Why people come into our lives
And walk with us a mile.

Dr. Baumgartner requested the delegates to show their respect to these, our departed members, by standing a moment in silence.

Moment of silence adopted this portion of the report.

2. *Report of the Committee on Public Health.* The Reference Committee reviewed the Report of the Committee on Public Health and noted there had been no formal meeting in the past year. The Committee was, however, polled by the Chairman, Dr. P. L. Owens, in respect to their sentiments regarding the possibility that the State Health Department furnish the polio vaccine for organized immunization clinics, much the same as is being done at present with triple DPT vaccine and smallpox vaccine. There were two members of the Committee opposed, one in favor with reservations, and seven members in favor. It would appear from the report that an opinion of the House of Delegates in this matter is desired.

The Chairman of the Public Health Committee was most active in presenting his views to the State Legislative Committee regarding the Milk Control Bill, which the Sixth District Medical Society also went on record as opposing. The bill failed.

This portion of the report was adopted.

As a supplement to the above report, the following letter was received from Dr. Percy L. Owens, dated April 24th:

"In regard to my report for the Public Health Committee concerning the polling of the members as to whether or not they would favor the handling of polio vaccine by the North Dakota State Health Department. I am going to be out of town on Sunday when the House of Delegates meets, and would appreciate it if you could convey to them this additional information.

Speaking ex-officio for Mr. W. Van Heuvelen, he wishes to state that the Health Department is not asking for this transfer, but would do so only on the request of the North Dakota State Medical Society. In other words, it is not a desire on the part of the State Health Department to take over this function. The representative from the Polio Foundation stated that they did not want the local chapters to pay for vaccine or pay the personnel for giving the vaccine. Whether or not they would entirely withdraw from the field, I do not know, but it was my impression that they wish to get out of this field. I believe that it would be a shame if some of the counties in the State who have no physician would be unable to obtain vaccine for immunizations from either the Polio Foundation or the North Dakota State Health Department.

Yours very truly,
(Signed) Percy L. Owens, M.D."

Dr. Baumgartner, Chairman of the Reference Committee, stated that he had talked to a number of the men and the majority of them felt it was best to leave this matter alone, rather than have the state handle this from the standpoint of the vaccine as it is now. The DPT and smallpox vaccine is available to any physician in the state. Most of the doctors get their own vaccine and there are only a few in the state who get theirs from the State Health Department, to furnish it to these clinics.

Dr. Baumgartner moved that we go on record that we do not favor the State Health Department furnishing the polio vaccine for organized clinics throughout the state on the same basis that they now furnish triple vaccine and smallpox vaccine. Motion seconded by Dr. Erenfeld and carried by a 14 to 10 vote.

3. *Report of the Committee on Public Relations.* The Reference Committee noted that there was no report of the Committee on Public Relations and assumed that they were inactive in the past year.

4. *Report of the Committee on Official Publication.* The Reference Committee noted that the contract with THE JOURNAL-LANCET is in effect for one more year and that there was, therefore, no cause for a meeting of this Committee in the past year. Any suggestions or changes desired by any member of the Association is welcomed.

This portion of the report was adopted.

5. *Report of the Committee on Legislation.* The Reference Committee noted, on reviewing this report, that our members were quite active on a local level, this being the year that the legislative body of North Dakota met. It noted, with favor, that the bills presented were generally in accord with the sentiments of the Medical Association of the State of North Dakota.

The Committee noted, however, that we must be ever mindful that it is very evident that health bills, both nationally and state-wide, are becoming increasingly more and more directed toward the destruction of the practice of medicine as a private enterprise. It behooves us, then, to remain informed on all bills affecting the physician directly or indirectly, and to continue to keep our legislative bodies constantly cognizant of our views.

The Reference Committee complimented the Committee on Legislation and our Executive Secretary, Mr. Lyle Limond, on their active participation in the past year.

This portion of the report was adopted.

Dr. Baumgartner, Chairman of the Reference Committee, moved that the report as a whole be adopted. Motion was seconded by Dr. Nugent and carried.

CARL BAUMGARTNER, M.D., Chairman
A. F. HAMMARGREN, M.D.
WELDE FREY, M.D.
NEIL A. MACDONALD, M.D.
F. R. ERENFELD, M.D.

Reference Committee to Consider the Reports of the Committee on Medical Economics, Advisory Committee to Public Assistance Division of State Welfare Board, and Committee on Rural Health

Dr. Arthur Burt, Chairman, presented the following reports and their discussions, which were adopted section by section and as a whole.

1. *Committee on Medical Economics.* The Reference Committee commended Dr. Peters and his negotiating team, the Committee on Medical Economics, for a job extremely well done. It was suggested that the negotiating team remain intact, with Dr. Peters as Chairman. Further, they expressed their appreciation to his members who have done considerable traveling at their personal expense.

Because of the fact that numerous errors and inequities in the relative value schedule are and will be inevitably present, the Reference Committee recommended that the Economics Committee revise and implement this schedule every two years.

This portion of the report was adopted.

(a) State Welfare Board. Regarding the negotiations with the State Welfare Board, the Committee appreciated the many hours spent in negotiations with the Welfare Board. They recommended that negotiations continue in order to preserve the quality of medical care that has been given to indigent patients throughout the years.

This portion of the report was adopted.

(b) Workmen's Compensation Bureau. The Reference Committee was appreciative of the job done by the negotiating team with the Workmen's Compensation Bureau and has reason to hope and believe that the Workmen's Compensation Bureau fee schedule will be satisfactorily adjusted in the immediate future.

This portion of the report was adopted.

(c) Veterans Administration. The Reference Committee noted that the Veterans Administration had turned down completely the Relative Value Schedule at the present time. There appears to be no understanding with

the Veterans Administration, and further negotiations are fruitless. It has become apparent that no contract will exist with the Veterans Administration and it was recommended that all members of the Association be notified to this effect.

This portion of the report was adopted.

(d) Bureau of Indian Affairs. The Bureau of Indian Affairs negotiated without too much difficulty and accepted the Relative Value Schedule with a unit value of \$2.75 for medical services, \$3.20 for surgical services, and \$5 for radiology and laboratory services. The Committee commended the Medical Economics Committee on their success in this venture, and recommended the acceptance of this portion of the report.

This portion of the report was adopted.

(e) Vocational Rehabilitation. The Vocational Rehabilitation Unit has agreed to pay the usual, reasonable fees of all physicians without reference to the Relative Value Schedule.

This portion of the report was adopted.

(f) Blue Shield. The Reference Committee recommended the acceptance of the Committee's report for continuing negotiations with Blue Shield, regarding the Relative Value Fee Schedule and endorsed the principle of the Relative Value Schedule as such. No difficulty was anticipated in reaching common ground with Blue Shield, and it was hoped that this could be done as soon as possible.

This portion of the report was adopted.

2. *Committee on Rural Health.* The following is the report from the Committee on Rural Health, submitted by Dr. Jacobson, Chairman of this Committee:

We, the members of the Committee on Rural Health, wish to make the following recommendations:

1. The hospitals and their medical staffs should encourage the rural practitioner to become a staff member.

2. The improvement of the relationship between the referring rural physician and the specialist.

3. All physicians in the state should encourage the public to use general practitioners in respective communities.

4. Nursing homes and old age homes may be built in any community where there is medical service (not necessarily a hospital). There should be good ambulance and attendant service.

5. We wish to commend the physicians and nursing staff of our district health units, as well as the state laboratories, for doing a good job, and recommend that all geographic areas of our state develop district health units.

6. We would like to encourage our North Dakotans who have finished their formal medical education to consider the many advantages of rural practice in our state.

7. Recognizing that the vast majority of our ills are psychogenic in origin, we, the general practitioners, should be familiarized with the principles of suggestion and hypnosis. We also feel that there should be increased use of physiotherapy and manipulation.

Respectfully submitted,

M. S. JACOBSON, M.D., Chairman

Each unit of this report was discussed separately, inasmuch as there were so many points included in the report.

1. Point No. 1 was discussed and the motion made by Dr. Palmer that it be amended to read: "The hospitals and their medical staffs should encourage the rural practitioner to join the hospital staff according to the hospital regulations involved." Seconded by Dr. Melton and carried.

2. Point No. 2 was adopted as presented by Dr. Jacobson.

3. Point No. 3 was adopted as presented.

4. Point No. 4 was adopted as presented.

5. Point No. 5 was adopted as presented.

6. Point No. 6 was adopted as presented.

7. There being no second to this recommendation, this point was not adopted.

Dr. Burt, Chairman of the Reference Committee, moved that the report as a whole, with the amendment to point 1, and with the exception of point 7, be adopted. Motion seconded by Dr. Mahowald and carried.

ARTHUR BURT, M.D., Chairman

E. A. HAUNZ, M.D.

V. J. FISCHER, M.D.

EDMUND VINJE, M.D.

F. M. MELTON, M.D.

The Speaker, Dr. Dodds, asked that the Secretary convey to the President the vote of the Reference Committee and the House of Delegates to keep the present team on the Committee on Medical Economics.

Report of the Reference Committee on Resolutions

Dr. Frank Naegeli, Chairman of the Committee, presented the following resolutions:

RESOLUTION

Whereas, the members of the North Dakota State Medical Association attending the seventy-second annual meeting of the Association in Bismarck, having enjoyed the hospitality and kindness of this fair city, and

Whereas, the Mayor of Bismarck and his associates, the press, radio, hotels and business men have made this session a memorable one,

Now, therefore, be it resolved that the House of Delegates expresses its appreciation by directing a copy of this Resolution to the Honorable Mayor of Bismarck."

This resolution was adopted.

RESOLUTION

Whereas, The Woman's Auxiliary to the North Dakota State Medical Association has, through various projects entailing continuous work and effort, raised the sum of approximately \$16,500 for their Medical Student Loan Fund at the medical school of the University of North Dakota, and donated \$750 to the American Medical Educational Fund, and

Whereas, these funds have been of great value to many medical students and to the medical school, and

Whereas, other worthwhile projects, such as mental health and recruiting of nurses and medical technologists; fostering *Today's Health* magazine; social legislative endeavors, especially those directed against the Forand Bill; initiation of essay contests; and sponsorship of the Medical Student Wives' Association, all made for continuing good will for the medical profession in North Dakota,

Now, therefore, be it resolved that the House of Delegates of the North Dakota Medical Association convey to the Woman's Auxiliary to the Association their appreciation and thanks for their excellent work and vision in their splendid projects, and

Be it further resolved that a copy of this resolution be directed to the President of the Woman's Auxiliary.

This resolution was adopted.

RESOLUTION

Whereas, the exhibitors have shown great effort and interest in this meeting and former meetings in developing their exhibits and adding to the scientific interest,

Now, therefore, be it resolved that the North Dakota State Medical Association extend to them our hearty welcome and thanks, and

Be it further resolved that a copy of this resolution be sent to each exhibitor.

This resolution was adopted.

RESOLUTION

Whereas, Dr. Leonard Larson, a trustee of the American Medical Association; Dr. Willard Wright, our delegate to the American Medical Association and Chairman of the Medical and Related Facilities Committee of the American Medical Association; and Dr. C. J. Glaspel, Secretary of the North Dakota State Board of Medical Examiners and Past-President of the Federation of Medi-

cal State Boards have done yeoman service and brought honor to the North Dakota State Medical Association.

Now, therefore, be it resolved that this Association take cognizance of their services and pay tribute to these men for their efforts on behalf of the North Dakota State Medical Association, and

Be it further resolved that a copy of this Resolution be forwarded to each of these men.

This resolution was adopted, by a standing vote of thanks.

RESOLUTION

Whereas, Dr. O. A. Sedlak, President of the North Dakota State Medical Association for the year 1958-1959 has given untiringly and unselfishly of his time and services toward the continued progress of medical practice in North Dakota,

Now, therefore, be it resolved that the assembled delegates show their appreciation by a rising vote of thanks.

A rising vote of thanks adopted this resolution unanimously.

RESOLUTION

Whereas, the members of the Seventy-second annual meeting of the North Dakota State Medical Association have thoroughly enjoyed and profited by an excellent scientific program, and

Whereas, the host, the Sixth District Medical Society and the various chairmen and committeemen have excelled in providing the members of the Association with the niceties of a gracious convention,

Now, therefore, be it resolved that the assembled delegates demonstrate their appreciation by a rising vote of thanks.

A rising vote of thanks adopted this resolution.

RESOLUTION

Whereas, the American Association of Medical Assistants, a national organization, wishes to establish a North Dakota Chapter, and

Whereas, this organization was approved by the American Medical Association in November, 1956,

Now, therefore, be it resolved that the North Dakota State Medical Association favors the formation of a North Dakota Chapter of the American Association of Medical Assistants, and

Be it further resolved that the Executive Secretary of the North Dakota State Medical Association forward a copy of this Resolution to the Chairman of the Membership Committee of said Association.

This resolution was adopted.

RESOLUTION

Whereas, the JOURNAL-LANCET, the official publication of the North Dakota State Medical Association, has been featuring the biographies of outstanding senior physicians in their publication, and

Whereas, Dr. J. Arthur Myers, Editor-in-Chief of the JOURNAL-LANCET, is interested in having North Dakota physicians included in this program, and has requested that the North Dakota State Medical Association furnish the biographies of such outstanding senior physicians, and

Whereas, it has been proposed that the President of the North Dakota State Medical Association appoint a committee to choose some of our outstanding physicians and furnish the JOURNAL-LANCET with a biography of each physician,

Now, therefore, be it resolved that this Resolution be referred to the Standing Committee on Necrology and Medical History for preparation of suitable biographies of selected North Dakota physicians.

This resolution was adopted.

RESOLUTION

Whereas, the House of Delegates of the American Medical Association has asked each component medical association to answer two questions:

1. Free choice of physician: "Acknowledging the importance of free choice of physicians, is this concept to be considered a fundamental principle, incontrovertible, unalterable, and essential to good medical care without qualification?"

2. Participation in Closed Panel Systems: "What is, or will be your attitude regarding physician participation in those systems of medical care which restrict free choice of physicians?"

And whereas, these questions were raised because of the report of the American Medical Association Commission on Medical Care Plans which was submitted to the American Medical Association Delegates in Minneapolis in December, 1958,

Now, therefore, be it resolved that the House of Delegates of the North Dakota State Medical Association go on record as stating that it is in sympathy with the report as a whole, and that a letter to this effect be sent to Dr. L. W. Larson, Chairman of the American Medical Association Commission on Medical

Care plans and to Dr. F. J. L. Blasingame, Executive Vice-President of the American Medical Association.

This resolution was adopted.

RESOLUTION

Whereas, it has been noted that it is the generally accepted procedure, in the several states, to have a doctor of medicine as the State Health Officer, and

Whereas, the House of Delegates has in previous sessions recommended that a doctor of medicine be obtained for this position in North Dakota, and

Whereas, the North Dakota State Health Department has been without a doctor of medicine as State Health Officer since July 1, 1953,

Now, therefore, be it resolved that the Committee on Public Health be instructed to search actively for an applicant for this position, and to present his name to the Governor of North Dakota, and

Be it further resolved that a copy of this Resolution be sent to the following:

1. Honorable John E. Davis, Governor of North Dakota
2. State Health Council
3. North Dakota Public Health Association
4. North Dakota Tuberculosis and Health Association

This resolution was adopted.

RESOLUTION

Whereas, at the present time the State of North Dakota does not have a toxicological laboratory, or a qualified toxicologist, and

Whereas, the only work of this type is presently done by Dr. G. A. Abbott, who is eighty years old, and retired, and

Whereas, the present situation does not make it possible to have a full time toxicologist in the State because of the salary involved, and

Whereas, adequate laboratory facilities are now present at the University of North Dakota Medical School and would not require duplication, and

Whereas, it could be possible for one of the present laboratory staff to obtain this training in lieu of the difficulty presented in obtaining a fully qualified toxicologist,

Now, therefore, be it resolved that the Committee on Medical Education be directed to investigate the possibilities of establishing an adequate toxicological laboratory and its implementation through the procurement or training of a qualified toxicologist.

This resolution was adopted.

RESOLUTION

Whereas, the State Medical Society of Wisconsin has passed and has asked our Association to support the following resolution to wit:

"Whereas, traffic accidents each year kill more than 37,000 persons and injure another 1,400,000, causing not only tragic suffering and loss of life but costs exceeding five billion dollars in wage loss, property damage, and medical services, and

Whereas, the attention of the nation has been effectively directed to some of the great problems and philosophies of human living through the issuance of special commemorative stamps,

Now, therefore, be it resolved, that the Postmaster General of the United States be petitioned to issue annually, for five consecutive years, a special commemorative stamp on the theme of traffic safety, each year's stamp to receive its first day of issue from the capitol city of each state of the United States, and"

Be it therefore resolved that the North Dakota State Medical Association adopt said resolution and that copies of this resolution, bearing the seal of the State Medical Association of North Dakota, be sent to the Governor of North Dakota; the United States Senators and Representatives from North Dakota; the Postmaster General and the President of the United States; the President and President-Elect and Executive Vice-President of the American Medical Association, as well as the President of the State Medical Society of Wisconsin.

This resolution was adopted.

RESOLUTION

Whereas, the primary interest of the North Dakota State Medical Association is in the best possible medical care for the citizens of North Dakota,

Now, therefore, be it resolved that the North Dakota State Medical Association recommends that the Superintendent of the State Institutions for patient care at Dunseith, Grafton, and Jamestown be a qualified Doctor of Medicine.

Dr. Naegeli moved the adoption of this resolution and it was seconded by Dr. Nugent.

Speaker Dodds asked for discussion concerning this resolution. It was felt that, as a group, the House should not foster one side or another in this controversial issue,

but rather should act in an advisory capacity to any governing board.

Speaker Dodds advised the delegates that another resolution would be coming up for action regarding the appointment of an advisory group to the Board of Administration.

It was felt by the House that the feeling of the members of the House of Delegates should be made known to the Advisory committee so they would be in a better position to advise.

Dr. Strinden called the attention of the delegates to the fundamental principle in the abstracts from "Standards for Psychiatric Hospitals and Clinics," which states: "The Superintendent, Manager or Director should be a well-qualified physician and an experienced psychiatrist with administrative ability. He should be the Chief Professional and Administrative officer of the hospital, department, or clinic, free from partisan political interference, and should have authority commensurate with his responsibility. He should be administratively responsible only to the appointing authority."

Speaker Dodds called for a vote on the resolution, stating that, as the matter stands, if a delegate voted "yes," he was taking a stand as endorsing the principle of the American Psychiatric Association, and if the delegate voted "No," he was taking no stand whatsoever. The resolution was adopted by a vote of all Ayes.

RESOLUTION

Whereas, the North Dakota State Board of Administration is charged with the management of several of our state institutions, whose operation involves problems of a medical nature,

And whereas, the North Dakota State Board of Administration does not have, at present, an advisory committee on medical problems,

Now, therefore, be it resolved that the President of the North Dakota State Medical Association shall, upon request by the North Dakota State Board of Administration, appoint a liaison committee to assist and advise that Board in matters of a medical nature which may come under its jurisdiction.

This resolution was adopted.

Dr. Naegeli moved the adoption of the report as a whole. Dr. Mahowald seconded the motion and the report as a whole was adopted.

F. D. NAEGLI, M.D., Chairman
F. A. DECESARE, M.D.
MILTON NUGENT, M.D.
R. E. MAHOWALD, M.D.
J. N. ELSWORTH, M.D.

Dr. Melton made the motion that the council be directed to release a press notice concerning the last two resolutions. Dr. Tudor seconded the motion and it was carried.

Dr. Strinden next addressed the House, as follows: "I am disturbed by the possibility of bad publicity for the doctors on the motion regarding the polio vaccine, which followed the report of the Public Health Committee. I would like to make a motion that the House of Delegates go on record as suggesting that each district society work out a plan based on the Fargo plan to provide such vaccine to indigent patients, at the written request of the physician, so that we, as doctors, will provide some means for the indigent patient to procure this vaccine." Motion seconded by Dr. Pray and carried.

At this time Dr. Dodds presented to the House of Delegates, the president, Dr. O. A. Sedlak, who spoke as follows:

Members of the House of Delegates and guests: I addressed this organization this morning in reference to a little plan I had in mind. I mentioned that some 5,900 to 6,000 Blue Shield claims are being processed each year. This burden is becoming greater and it is getting to a point where it is impossible for a full-time medical man to process these claims. I would like to

delegate this work to a lay board. I thought it might be possible for the State Association to institute some medical review boards on a county level, or even so far as down to a hospital level, which would work approximately the same as the Tissue Committees that are now in existence. As you know, the Tissue Committees have abolished all unnecessary surgery. The same, perhaps, could be done regarding medical care. It is my feeling that if a medical review committee could be set up, starting with the state level, going down to the county level and possibly the hospital level, this committee could review all cases of abnormal or prolonged hospital stay, and ascertain the cases admitted to a hospital for diagnostic purposes. I think they should have the same power as the Tissue Committee but not necessarily be a disciplinary committee. For that reason, I would like to have the House of Delegates consider the possibility of instituting a medical review committee, starting on a state level and going down as far as you see fit. This could be of the utmost importance to Blue Shield, commercial underwriters and all participants. I know the commercial insurance companies would appreciate this also. I think on a local level the work would not be much more difficult than the Tissue Committee work, while at this time the work piled up in the central office is getting to where it can not be handled.

No one in one town in North Dakota knows what the conditions are in another town, so I think this should be controlled on a local level. I would like to have some discussion about this matter. If it is possible to implement such a committee, I would like to have this for one of the first problems for the new President to tackle."

Speaker Dodds addressed the delegates regarding the suggestion made by Dr. Sedlak, stating that there should be some discussion on the matter before any motion was formulated.

After much discussion and many suggestions on the part of the delegates, Dr. Mahowald moved that the President appoint a committee to evolve a means of evaluating excessive hospitalization periods and insurance claims for these periods, with due consideration to remarks made in the House of Delegates in reference to this matter, and that this committee then report to the House of Delegates at its next session next year.

Motion seconded by Dr. Tudor and carried.

Dr. Vinje addressed the Delegates as follows:

"I would like to suggest a possible amendment to the Constitution and Bylaws. In the District Society a man is privileged to vote only if present at the annual meeting as a delegate. In a recent publication, it was stated that there are some 7,000 doctors in New York who do not belong to the American Medical Association, their reason being that they do not have anything to say about what goes on. Perhaps a possible solution would be to change our State Association constitution to read that a qualified member of a district society would be privileged to vote by proxy so that in case he was unable to attend the annual meeting, he could still have a voice in the particular proceedings of his association. I thought if we could change our state constitution and bylaws, this would be a start so that every member eventually might have a chance to vote in the National Association. This would require an amendment to the constitution and bylaws, and I believe it would have to be acted upon a year from now, providing the House of Delegates could decide that this would be referred."

Speaker Dodds inquired if Dr. Vinje would care to refer this matter to the Committee on Constitution and Bylaws, or if he wished to have action by the House at this time. The action proposed by Dr. Vinje could prove to be unwieldy; the House might not be able to function until all the proxies were in.

Dr. Vinje replied:

"I realize this would cause problems. However, the American Medical Association is supposed to represent the entire medical profession in the United States. Because of its size, one could compare us to a large company; we are acting as stockholders in a large society. The American Medical Association is much more important than any big business. If we could set up such an association that could be carried up to the American Medical Association, we could, therefore, make it a more democratic body. This would cause more doctors to join the American Medical Association."

Speaker Dodds asked if Dr. Vinje wished to put this in the form of a motion: that all members of a medical society be solicited for their vote by proxy on all matters.

Dr. Vinje:

"Yes, on all matters of importance. The Societies could decide for themselves which matters should be polled through the membership."

There being no second to this motion, the motion died.

Speaker Dodds felt there was much merit in the thought, however, and that the proposal could perhaps be sent in in the form of a resolution.

The next order of business was the fixing of the per capita dues. The Chair knew of no request for an increase in dues and entertained a motion that the dues be fixed at the present rate. Dr. Vinje moved that the dues remain the same. Motion seconded by Dr. Mahowald and carried.

Dr. Erenfeld addressed the House as follows:

"It was my privilege recently to attend a meeting of the Arizona State Medical Society. I would like to offer something to think about. The Arizona State Medical Society is getting a firm of lawyers to represent the society in their malpractice suits. They procured the services of a firm of lawyers who were interested in the medical-legal problems and as such are available to any doctor in the state in a malpractice suit. I think that is a worthy suggestion. I think we should have a firm of lawyers in this state to represent our State Medical Association, if and when we need them. This is merely a suggestion for consideration."

Dr. Nugent made the motion that the resolutions passed by the House on this date not be given to the press until after the meeting with the Governor the following day. Dr. Tudor seconded this motion and it carried.

The next order of business was the report of the State Board of Medical Examiners, which was presented by Dr. Nierling in the absence of Dr. C. J. Glaspel, Secretary of the Board.

This report required no action, being merely for the information of the Delegates.

The next order of business was the selection of the city for the next annual meeting. In 1958 the House adopted the policy of selecting a meeting place two years in advance. In 1960 the meeting will be held in Grand Forks, and a meeting place for 1961 must now be chosen.

Dr. Melton, representing the First District Medical Society, extended an invitation to the North Dakota State Medical Association to meet in Fargo in 1961. A unanimous vote accepted the invitation.

Report of the Nominating Committee

Dr. R. B. Tudor, chairman, gave the following report of his committee:

President	Dr. J. C. Fawcett
President-elect	Dr. C. M. Lund
First Vice-President	Dr. E. H. Boerth
Second Vice-President	Dr. E. J. Larson
Speaker of the House	Dr. G. A. Dodds
Secretary	Dr. F. D. Naegeli
Treasurer	Dr. R. D. Nierling
Delegate to the A.M.A.	Dr. W. A. Wright
Alternate Delegate to the A.M.A.	Dr. T. E. Pederson
Councillors (Terms expiring in 1962):	
First District	Dr. V. G. Borland
Third District	Dr. R. O. Goehl
Sixth District	Dr. C. H. Peters

Board of Medical Examiners (Terms expiring in 1962):
(The Governor will appoint three)

1) Dr. G. W. Toomey, 2) Dr. R. D. Nierling, 3) Dr. R. W. Rodgers, 4) Dr. R. H. Waldschmidt, 5) Dr. R. E. Leigh

State Health Council: Dr. M. S. Jacobson

Dr. Tudor made the motion that the Secretary be instructed to cast a unanimous ballot for these nominees. Motion seconded by Dr. Fischer and carried.

R. B. TUDOR, M.D., Chairman
F. M. MELTON, M.D.
V. J. FISCHER, M.D.

The Chair asked each group of delegates from each district society to appoint a chairman and see that this chairman reports back to their society the actions the House of Delegates have taken at these two sessions.

Dr. Wright next spoke briefly to the House on matters that are up for action in the American Medical Association House of Delegates.

Dr. Larson addressed the House on matters of a national nature.

The motion was made, seconded, and passed for adjournment. Meeting adjourned at 4:00 P.M.

Scientific Program

May 4, 1959

Bismarck Auditorium

8:30 to 9:15 A.M.—Registration
9:15 to 9:30 A.M.—Greetings from the Mayor and the President of the Sixth District Medical Society.
9:30 to 10:00 A.M.—"The North Dakota Coronary Disease Study," Robert Painter, M.D., Grand Forks.
10:00 to 10:45 A.M.—"Common Anemias," Peyton Pratt, M.D., Omaha.
10:45 to 11:15 A.M.—Intermission
11:15 to 12:00 Noon—"The Treatment of Carcinoma of the Skin," Juan A. del Regato, M.D., Colorado Springs, Colo. (Sponsored by the North Dakota Division of the American Cancer Society).

NOON RECESS

1:30 to 2:00 P.M.—"Facial Palsy Treated with Cortisone," C. B. Porter, M.D., Grand Forks.
2:00 to 2:45 P.M.—"Problems in Recognition, Diagnosis and Management of Certain Lesions in Bone," D. C. Dahlin, M.D., Rochester, Minn.
2:45 to 3:15 P.M.—"Congenital CNS Defects Amenable to Surgical Treatment," Lee Christoferson, M.D., Fargo.
3:15 to 3:45 P.M.—Intermission
3:45 to 5:00 P.M.—Panel Discussion on Diagnosis and Treatment of Leukemia and Lymphoma. J. A. del Regato, M.D.; Peyton Pratt, M.D.; and D. C. Dahlin, M.D.

May 5, 1959

Bismarck Auditorium

8:30 to 9:00 A.M.—Registration
9:00 to 9:30 A.M.—"Psychiatric Facilities and Future Possibilities," John G. Freeman, M.D., Jamestown.
9:30 to 10:15 A.M.—"Diuretic Therapies," Gerald Gordon, M.D., Denver, Colorado. (Sponsored by the North Dakota Heart Association).
10:15 to 10:45 A.M.—Intermission.
10:45 to 11:30 A.M.—"Staphylococcal Infection of the Newborn," Fred G. Burke, M.D., Washington, D.C.
11:30 to 12:00 Noon—"The Diagnosis and Management of Rheumatoid Arthritis," Harold Neu, M.D., Omaha, Nebraska. (Made available by the National Foundation).

NOON RECESS

1:30 to 2:30 P.M.—Introduction: Honorary Members of the North Dakota State Medical Association.
Presidential Address: O. A. Sedlak, M.D., President, North Dakota State Medical Association.
Inaugural Address: J. C. Fawcett, M.D., President-Elect, North Dakota State Medical Association.
2:30 to 3:15 P.M.—"Office Gynecology," Edward Banner, M.D., Rochester, Minnesota.
3:15 to 4:00 P.M.—Intermission.
4:00 to 4:30 P.M.—"Management of the Patient with 'Back Ache'," Harvey O'Phelan, M.D., Minneapolis, Minn.

PRESIDENTIAL ADDRESS

Dr. O. A. Sedlak

It is seldom that I do any shopping. However, the other day I went into a super-market to get a loaf of bread and ten pounds of sugar. When I went up and down the aisles lined with attractively packaged foods,

I could not help picking up something here and something there and before I knew it my cart was full. I was rather shocked when the cash register rang up a total of \$23.87, but my greatest surprise awaited me when I arrived home and my wife discovered I did not have the loaf of bread, nor the ten pounds of sugar.

Sometimes I feel that the public demand for medical services is influenced largely by articles in the lay press. There is a constant barrage of articles in magazines warning against the dangers of cigarette smoking, the ingestion of unsaturated fats, the relation of anticoagulants in the course of coronary heart disease and myriads of other articles relating to cancer in various parts of the body. Do these articles really enlighten the public? I feel they do not; instead, they merely make people more apprehensive and more fearful of the unknown. What happens then—instead of coming to a doctor to get relief from a common cold, the patient comes in to find out whether or not he is anemic—whether or not he has tuberculosis or cancer—and leaves with a bill somewhat greater than my \$23.78 and still with no relief of his cold.

This leads up to the theme of my talk—The High Cost of Medical Care. Actually, dollar for dollar, the public gets much more for medical care than for anything else on the market today. I won't deny that many of the newer drugs are expensive and that hospital costs have skyrocketed during the past few years; yet the shortened period of morbidity more than compensates for these increased costs.

What happens, however, when a person is faced with a long illness or a major surgical problem? It is here where help is sought through insurance or a prepaid medical plan. And even insurance designed to meet the individual's financial problems does not solve it, because insurance hardly covers all the cost of medical care. Sometimes it covers almost nothing. Prepaid hospital and medical care, such as those given by Blue Cross and Blue Shield, under a service benefit, guarantees to a patient under the terms of their contract that their bill will be paid for and that the doctors and hospital will accept such dollar amounts as payment in full.

What then do you say is wrong with such a plan? There is nothing wrong, providing all parties concerned know their contractual agreements and abide by them. Third party payments are here to stay. Now it's up to each and every one to see to it that it works. Third party payments can be a friend of the physician, providing three cardinal principles are followed: there must be (1) a free choice of physicians, (2) non-interference in professional matters, and (3) adequate compensation, preferably on a fee basis. The best assurance of maintaining free choice is for the profession to see to it that the quality of medical service is kept at a uniformly high level. The work of tissue committees has practically eradicated all unnecessary surgery in most hospitals. It is just as important to have a similar medical committee to review medical care in the hospital. Medical organizations have failed to take effective disciplinary action against wayward members. Grievance committees in most instances are soft, cautious, or ineffectual.

Why do I stress these things? I do so because I'm convinced that increased medical costs are due not to the high cost of any one specific item but rather to the excessive addition of these items. Let me explain.

There is a general feeling among the younger men in our profession that more prophylactic medicine should be practiced. This means that periodic extensive diagnostic studies should be made on individuals even though they present no complaints. I have no argument against this type of practice, providing the public knows what to

expect in the way of costs. Examinations of this type have a predictable cost and, therefore, of necessity cannot be covered by any prepaid medical plan or insurance. Why is this type of examination expensive? It's expensive because it relies upon the interpretation of a lot of costly laboratory, x-ray, and pathological studies. Actually the doctor is hardly needed, for if the data is fed to an IBM machine or Univac it should come up with the proper diagnosis. As I stated before, this type of examination is not insurable; therefore, it becomes available only to those who can afford it. How long will it be before the middle class will feel that they too should have such medical care? And, if they cannot afford it, you know as well as I do that they will expect it from their government. It is nice to be idealistic, but at times it is also necessary to become realistic.

Let us get down to some cold figures. According to the last census, there are approximately 600,000 people in North Dakota. Let us say that half of this number are in an age group where yearly examinations are advisable. At a minimum of fifty dollars for such an examination, we arrive at a figure of fifteen million dollars. This is above and beyond what medical costs are for those who are actually ill. Do you think our economy is such that we can consider such a program at the present time?

I still feel that the primary role of the physician is to help keep people well—both mentally and physically. In order to do so, it is necessary for the physician to regard man as a rational being, possessing both body and soul. Man cannot be regarded as an assembly of parts, either organic or inorganic; neither can the physician adequately treat one part of the body without knowing what is taking place throughout the individual as a whole. This modern trend toward a high degree of specialization is a trend which, in my opinion, leads to ever increasing higher medical costs. I still feel there is a place in medical circles for a family physician, an understanding individual who knows something about the problems of his patient, a man with enough clinical judgment to determine whether or not there is anything seriously wrong with his patient and then, if necessary, refer the patient to a specialist for further evaluation.

Without a family doctor, however, the patient is lost. He wanders from one specialist to another. Just recently at a national meeting it was suggested that a questionnaire be handed every patient on admission so that the receptionist could channel the patient to the proper doctor. Is this a free choice of doctors?

This reminds me of an old story popular during the depression days. It seems that there was a large welfare office with a very inadequate office corps. An efficiency expert was called in to solve the situation. He fixed it so that when you entered the front door, you found yourself in a room with two doors, one marked male and the other female. Going through the proper door you again found yourself in another room with two doors—one marked single, and the other married. After going through the right door you entered a room with four doors, one marked no dependents and the others marked 1, 2, and 3 or more. Walking through the door which met your requirements, you entered another room and there again were two doors, one marked Republican and the other Democrat. If you chose the one marked Republican, you promptly found yourself out in the cold again right where you started.

I am sure this is exactly where the patient finds himself unless he has someone he can consider his private physician.

Today physicians have available many valuable, high-

ly potent drugs. These miracle drugs have certainly been a blessing to mankind, providing, however, they are properly used. Penicillin is one of these miracle drugs; it has saved countless lives. Yet how many in this room can recall the tragic effects of this same drug when given intrathecally in too large a dose? How many here can remember sulfa crystals plugging the entire urinary tract? Today we are still seeing too many man-made illnesses. These all can be greatly eliminated through a proper understanding of the pharmacology and physiological action of these preparations.

The factors I have mentioned contributing to increased medical costs are some I have encountered during my year as president; they are factors over which we as doctors have a definite control. We can not do much about inflation, higher labor costs, shorter hours, all of which add to hospital costs. If we, as physicians, do all in our power to give the public the best medical care at a reasonable cost, I am sure we can place ourselves in a better position in the public's eye than where we find ourselves today.

There are going to be trying times ahead of us. There will be violent differences of opinion involved in taking a stand on the issues confronting us. As Willard Wright so aptly expressed in the last paragraph of his report, "Expression of various opinions is a necessary part of the democratic process, but it is hoped that when a final decision has been reached, members will give their Association loyal support."

With mixed emotions, I am relinquishing my office. I feel confident that the splendid cooperation given me during the past year will be carried forward to the years ahead.

Introduction: Honorary Members Fifty-Year Club Members

DR. O. A. SEDLAK: It gives me great pleasure now to recognize four gentlemen in the state of North Dakota who have a combined practice of two hundred years. I would like to introduce the gentlemen, and award them a plaque and a pin, in recognition of their services, which I hope they will wear with pride.

Dr. Oscar M. Smith of Dickinson, North Dakota, graduated from the University of Minnesota in 1909 and was licensed in North Dakota in 1910. He at one time practiced in Killdeer, North Dakota. The North Dakota State Medical Association does hereby award Doctor Smith the Certificate of Distinction, in recognition of his practice of medicine for fifty years or more. His untiring ministry to the ill has done honor to God, his community, his profession and himself.

Here is a pin, Doctor Smith, which I hope you will wear with pride.

Dr. Simon W. Hill, Regent, North Dakota, was born in 1884 at Hillsboro, West Virginia. He graduated from the University of Maryland, Baltimore, Maryland, in 1909 and was licensed in North Dakota in July 1911. He practiced medicine from 1909 to 1911 at Switchback, West Virginia. He was honored in June 1957 for forty-six years of practice at Regent, North Dakota.

Doctor Hill, the North Dakota State Medical Association hereby awards you the Certificate of Distinction and the pin which I hope you will wear with pride.

Dr. Frederick Griebenow was born April 25, 1878. He graduated from the University of Minnesota in 1909 and was licensed in North Dakota in January 1911. He has been associated with the Quain-Ramstad Clinic in Bismarck in specialty work of Dermatology. The North Dakota State Medical Association awards you, Doctor Griebenow, the Certificate of Distinction and the pin.

Dr. Simon W. Melzer, Woodworth, North Dakota, graduated from the Northwestern University Medical School of Chicago, Illinois, in 1909, and was licensed in North Dakota in July 1915. Doctor Melzer was also awarded the Certificate of Distinction and the pin, but it is impossible for him to attend. The Certificate and his pin will be mailed to him.

These four gentlemen are now considered Honorary Members of the North Dakota State Medical Association.

DOCTOR SEDLAK: Now comes the time when I have to say goodbye to all of you. I would like to introduce to you our new president, Dr. John Fawcett. Will you escort Doctor Fawcett to the rostrum, Doctor Waldschmidt?

INAUGURAL ADDRESS

Dr. John C. Fawcett

This is, for me, an honor and an eventful occasion, the more so as I realize that just twenty-four years ago my father was similarly honored by being inaugurated president of the North Dakota State Medical Association. If I am not mistaken, I will be the second president whose father was president before him, the other being Dr. Joseph Sorkness of Jamestown.

It is an education and a revelation to read the fine book on the History of Medicine in North Dakota, compiled and written by Doctor Grassick in 1926. This book covers records compiled by him, from medicine in territorial days (the man of medicine then being usually the military surgeon), to the preliminary meeting in Larimore in 1887. The first organization meeting of the Society was in Grand Forks the following year, the first president being a Dr. J. G. Millsbaugh of Park River. From there, the book takes us through the years to the presidency of Dr. J. H. Rindlaub of Fargo in 1926, where his narrative ends.

I believe it can well be said of medicine, in recent years—scientifically, socially and politically—that it closely parallels the problems of the country and of the world in these hectic days of world strife; of terrific scientific advances; of seemingly insurmountable social and economic problems. We are apt to reflect on "the good old days" when events went at a more leisurely pace; when exact diagnosis and specific treatment were not as essential; when coronaries were fewer and farther apart.

But what about our predecessors in organized medicine? What were their thoughts and problems? After reading some of The History of Medicine in North Dakota, and some of the monographs that these medical men left behind them, I am filled with more and more respect for those whose foresight and good judgment built our society, and the standards of our medical practice, to what they are today. Their first thoughts were those of improving the standards of medical practice; of ousting the quack and the charlatan; of establishing a code of ethics and hewing to the Oath of Hippocrates; of endorsing self-discipline in the separate members of the society; of anticipating legislation that might be detrimental to the highest type of medical service.

In the Code of 1869, the first territorial laws prescribed *who may practice medicine*. This was somewhat changed in 1885, and after 1890 and statehood, Medical Practice Acts were changed somewhat from time to time to meet changing trends and needs until 1911 or 1912. From then until a revised Practice Act was passed by the Legislative Session of 1957, no changes were made. This, I think, speaks highly of the men of wisdom, clear and forward thinking, that were active in the early days of our society. They could not, of course, have anticipated all our present day problems, but they certainly did anticipate an increasing tendency on the part of govern-

ment to not only regulate, but to take over the rendering of medical services by a physician to his patient. I can well remember some of the discussions between my father and his contemporaries concerning this trend at least 35 years ago.

And so our problems of 1959-60 are basically an evolution and a maturing of many found or anticipated at the turn of the century. We have, and we will continue to have, many problems to ponder and to attempt to solve. Always foremost among these is the control of our profession, and the policing of our own ranks: protection of the public from the ministrations of quacks and irregulars; watching that cooperatives, governmental boards, and private organizations do not work to the detriment of that which we, and those before us, have worked so hard to build; and survey of programs constructed and construed to cloud the issues.

Increasing costs of medical education, medical research, and medical services have made it increasingly easy for outside organizations to gain footholds and a larger voice in medicine. We are very aware of the fact that changes are inevitable, but let us strive to make these changes of benefit, and not an increasing weight about our necks—with the eventual deterioration of the art, if not the science. There is no one answer. We must evaluate all new ideas, both in and out of medicine itself; we must accept the good and fight to reject the bad; work for the common good of patient, doctor, and for better medicine for the state of North Dakota.

Public education, properly directed, plus continued close contact on the patient-doctor level, is essential. We must continue to keep our lawmakers keenly aware of our vital interest in all legislation touching on the public health. An example of such importance is pointed up by the current crisis at the State Hospital at Jamestown.

Medical representation, advisory or direct, on the State Board of Administration—a Board having jurisdiction over the State School at Grafton, the State Sanatorium, the Schools for the Deaf and for the Blind, as well as the State Hospital, would very likely have made it possible to avoid this serious situation.

It has been the policy of the State Board of Medical Examiners for the past several years to give candidates a brief, informal talk, advising them to actively participate in community affairs, social, political and religious. Progress has been made through the medium of press, radio, TV, and talks to local groups; and even through some of our cartoon media, all of which are excellent vehicles to convey to the public our interest in the common welfare. Further progress has been made in co-operation with press and radio; with the dental and legal professions. A great deal of misunderstanding must be adjusted with our old partners, the hospitals, who are taking more and more interest in active participation in the meting out of medical services, and showing a more aggressive participation in our medical service plans.

So, we must conclude that although there have been many facets involved in the changing picture of medicine over the past fifty years, it is now that they are coming more sharply into focus. Increasing diligence must be assumed by individual physicians, medical groups, and medical societies in working to advance the cause of medicine today, public-wise and public-relations wise.

With these few thoughts, I will conclude by very humbly accepting the Presidency of the North Dakota State Medical Association with the hope that our endeavors in the coming year may, at least in part, measure up to the outstanding work and accomplishments of those before us.

North Dakota State Medical Association Roster—1959

MEMBERSHIP BY DISTRICTS

First District

Amidon, Blaine F.	Dakota Clinic, Fargo
Armstrong, W. B.	Dakota Clinic, Fargo
Bacheller, Stephen C.	Enderlin
Bakke, Hans	Lisbon
Barnard, Donald M.	Fargo Clinic, Fargo
Beithon, Elmer J.	Red River Valley Clinic, Wahpeton
Beithon, Paul J.	Red River Valley Clinic, Wahpeton
Beltz, Melvin E.	Wahpeton Clinic, Wahpeton
Borland, Verl G.	Fargo Clinic, Fargo
Burt, Arthur C.	405 Black Bldg., Fargo
Christoferson, Lee A.	702 1st Ave. S., Fargo
Christu, Chris M.	Fargo Clinic, Fargo
Corbus, Budd C.	314 Black Bldg., Fargo
Crim, Eleanor M.	1701 13th St. S., Fargo
Darner, Charles B.	Fargo Clinic, Fargo
Darrow, Kent E.	Dakota Clinic, Fargo
DeCesare, F. A.	Dakota Clinic, Fargo
Dillard, James R.	311 Black Bldg., Fargo
Dodds, G. Alfred	Fargo Clinic, Fargo
Donat, T. L.	Dakota Clinic, Fargo
Engstrom, Perry H.	Red River Valley Clinic, Wahpeton
Fercho, Calvin K.	812 Black Bldg., Fargo
Fortney, Arthur C.	Fargo Clinic, Fargo
Foster, George C.	15 Broadway, Fargo
Gaebe, Robert C.	117 N.W. Third, Valley City

Geib, M. J.	702 1st Ave. S., Fargo
Gillam, John S.	Fargo Clinic, Fargo
Goff, John R.	304 1st Natl. Bank Bldg., Fargo
Goltz, Neill F.	Fargo Clinic, Fargo
Gronvold, F. O.	910 Broadway, Fargo
Gustafson, Maynard B.	702 1st Ave. S., Fargo
Hall, G. Howard	Fargo Clinic, Fargo
Haugrud, E. M.	304 Black Bldg., Fargo
Hawn, Hugh W.	Fargo Clinic, Fargo
Heilman, Charles O.	Fargo Clinic, Fargo
Houghton, James F.	Dakota Clinic, Fargo
Hunter, C. M.	608 Black Bldg., Fargo
Hunter, G. Wilson	Fargo Clinic, Fargo
Irvine, Vincent S.	Lidgerwood
Ivers, George U.	424 de Lendrecie Bldg., Fargo
Jaehning, David G.	Red River Valley Clinic, Wahpeton
Johnsrude, Irwin	Fairmount
Klein, Allan L.	410-412 Gate City Bldg., Fargo
Kulland, R. E.	402 Sheyenne St., West Fargo
Lancaster, W. E. G.	Fargo Clinic, Fargo
Landa, Marshall	Dakota Clinic, Fargo
Larson, G. Arthur	812 Black Bldg., Fargo
Lawrence, D. H.	69½ Broadway, Fargo
LeBien, Wayne E.	Fargo Clinic, Fargo
LeMar, John D.	Fargo Clinic, Fargo
Lewis, A. K.	606 Ash St., Lisbon

Lewis, T. H. 302 Black Bldg., Fargo
 Lindsay, Douglas T. Fargo Clinic, Fargo
 Long, William H. Dakota Clinic, Fargo
 Lytle, Francis T. Fargo Clinic, Fargo
 Macaulay, W. L. Fargo Clinic, Fargo
 Magness, John W. Dakota Clinic, Fargo
 Mazur, B. A. Dakota Clinic, Fargo
 Melton, Frank M. Dakota Clinic, Fargo
 Miller, Herbert H. 509½ Dakota Ave., Wahpeton
 Murray, James B. Dakota Clinic, Fargo
 Norum, Henry A. Fargo Clinic, Fargo
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 Poole, Ernest E. Sasse Bldg., Lidgerwood
 Pray, Laurence G. Fargo Clinic, Fargo
 Rogers, Robert G. Dakota Clinic, Fargo
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 Schneider, J. F. 114 Broadway, Fargo
 Sedlak, O. A. Dakota Clinic, Fargo
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 Spier, J. J. 1345 North 5th St., Fargo
 Stafne, William A. Fargo Clinic, Fargo
 Story, Robert D. Fargo Clinic, Fargo
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 Thompson, George R. Fargo Clinic, Fargo
 Traynor, Mack V. Fargo Clinic, Fargo
 Triggs, Perry O. Fargo Clinic, Fargo
 Ulmer, Robert J. Dakota Clinic, Fargo
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 Veitch, Abner 502 Oak St., Lisbon
 Wall, Wendell H. Wahpeton Clinic, Wahpeton
 Wasemiller, E. R. Wahpeton Clinic, Wahpeton
 Webster, William O. Fargo Clinic, Fargo
 Weible, Ralph D. Dakota Clinic, Fargo
 Wiltse, Glenn L. Wahpeton Clinic, Wahpeton
 Wold, Lester E. Fargo Clinic, Fargo
 Zauner, Richard J. 608 Black Bldg., Fargo

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 Coultrip, R. L., Jr. McVile
 Engesather, J. A. D. Lakota
 Fawcett, John C. Lake Region Clinic, Devils Lake
 Fawcett, Robert M. Lake Region Clinic, Devils Lake
 Fox, William R. Johnson Clinic, Rugby
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 Keller, E. T. Johnson Clinic, Rugby
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 Lazareck, I. L. 411 Fourth Ave., Devils Lake
 Longmire, L. T. 411 Fourth Ave., Devils Lake
 McBane, Robert D. Lake Region Clinic, Devils Lake
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 Munro, J. A. Rolla
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 Palmer, D. W. Cando
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 Schwingamer, E. J. New Rockford
 Seibel, Glenn W. New Rockford
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 Stickelberger, Josephine S. 1524 Portland Ave.,
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 Terlecki, Jaroslaw Minnewaukan
 Toomey, Glenn W. Lake Region Clinic, Devils Lake

Vigeland, George N. Johnson Clinic, Rugby
 Voglewede, William C. Carrington

Third District

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 Benwell, Harry D. 4½ S. Third St., Grand Forks
 Berger, P. R. Grand Forks Clinic, Grand Forks
 Campbell, Robert D. 4½ S. Third St., Grand Forks
 Cardy, James D. U.N.D. Medical School, Grand Forks
 Clark, Rodney Grand Forks Clinic, Grand Forks
 Clayburgh, Bennie J. Grand Forks Clinic, Grand Forks
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 Frey, Wellde W. Drayton
 Glaspel, C. J. Grafton Clinic, Grafton
 Goehl, R. O. Grand Forks Clinic, Grand Forks
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 Graham, John H. 15½ S. Third, Grand Forks
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 Hill, Frank A. Grand Forks Clinic, Grand Forks
 Jensen, A. F. 1600 University Ave., Grand Forks
 Johanson, John F. Cavalier
 Kaluzniak, Nicholas Langdon
 Landry, L. H. Walhalla
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 Meredith, William C. Drayton
 Miller, Donald W. Grand Forks Clinic, Grand Forks
 Moore, J. H. Grand Forks Clinic, Grand Forks
 Muus, Jacob M. McVile
 Muus, O. Harold 502 Commercial Exchange Bldg.,
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 Nelson, Wallace W. Grand Forks Clinic, Grand Forks
 Nelson, William C. Grand Forks Clinic, Grand Forks
 Olmstead, Edwin G. U.N.D. Medical School
 Grand Forks
 O'Toole, James K. Park River
 Painter, Robert C. Grand Forks Clinic, Grand Forks
 Panek, A. F. Milton
 Peake, Frances Margaret 204 Widlund Bldg.,
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 Peterkin, Frank D. Langdon
 Pettit, Samuel L. Grand Forks Clinic, Grand Forks
 Piltingsrud, Harold R. Park River
 Porter, Charles B. Grand Forks Clinic, Grand Forks
 Powers, William T. 4½ S. Third St., Grand Forks
 Prochaska, Leonard J. 517 1st Natl. Bank Bldg.,
 Grand Forks
 Ralston, Lloyd S. Grand Forks Clinic, Grand Forks

Rand, C. C. Grafton State School, Grafton
 Ruud, John E. 1st Natl. Bank Bldg., Grand Forks
 Sandmeyer, John A. Grand Forks Clinic, Grand Forks
 Silverman, Louis B. Grand Forks Clinic, Grand Forks
 Tarpley, Harold I. 4½ S. Third St., Grand Forks
 Teevens, William P. Grafton Clinic, Grafton
 Thorgrimsen, G. G. 1600 University Ave., Grand Forks
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 Woutat, P. H. Grand Forks Clinic, Grand Forks
 Woytassek, Leonard E. Larimore
 Youngs, Nelson A. Grand Forks Clinic, Grand Forks
 Yury, Walter E. 1004 Hill Ave., Grafton

Fourth District

Amstutz, Kenneth N. Northwest Clinic, Minot
 Anderson, Gordon D. Harvey Medical Center, Harvey
 Anthony, John Stanley
 Ayash, John J. 123 2nd Ave. S.E., Minot
 Blatherwick, Robert Parshall
 Boyle, John T. Garrison
 Boyum, Lowell E. Harvey Medical Center, Harvey
 Boyum, P. A. Harvey Medical Center, Harvey
 Breslich, Paul J. Northwest Clinic, Minot
 Brown, Glenn W. Malvey Clinic, Bottineau
 Cameron, Angus L. Northwest Clinic, Minot
 Cuadrado, A. R. San Haven
 Devine, J. L., Jr. Great Plains Clinic, Minot
 Devine, J. L., Sr. Great Plains Clinic, Minot
 Diduch, Alexander Stanley
 Dormont, Richard E. Northwest Clinic, Minot
 Erenfeld, Fred R. Erenfeld Clinic, Minot
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 Flath, M. G. Stanley
 Floch, John L. Mohall
 Gammell, Robert T. Kenmare
 Garrison, M. W. Garrison Bldg., Minot
 Giltner, Lloyd A. Medical Arts Clinic, Minot
 Goodman, Robert Powers Lake
 Gozum, Ekrem 123 2nd Ave. S.E., Minot
 Greene, E. E. Westhope
 Halliday, D. J. Kenmare
 Halliday, David Kenmare
 Halverson, C. H. 1st Natl. Bank Bldg., Minot
 Hammargren, A. F. Harvey Medical Center, Harvey
 Hart, George M. Northwest Clinic, Minot
 Hochhauser, Martin Garrison Clinic, Garrison
 Hoopes, Lorman L. 17A S. Main St., Minot
 Hordinsky, Bohdan Drake
 Huntley, Wellington B. Great Plains Clinic, Minot
 Hurly, William C. Medical Arts Clinic, Minot
 Johnson, O. W. Johnson Clinic, Rugby
 Kaemerle, Harold K. 423 Highland Ave., Elmhurst, Ill.
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 Kermott, L. H., Sr. 401 Main St. S., Minot
 Kitto, William Northwest Clinic, Minot
 Kohl, D. L. 123 2nd Ave. S.E., Minot
 Lampert, M. T. 407 1st Natl. Bank Bldg., Minot
 Larson, Richard S. Vela
 Leonard, Kenneth O. Garrison Clinic, Garrison
 Loeb, George L. 5407 26th Ave. S., Minneapolis 17, Minn.
 London, Carl B. Northwest Clinic, Minot
 McCannel, Archie D. 505 Main St. S., Minot
 McCullough, W. F. Bottineau
 McDougall, James R. 214 S. Main St., Minot
 Malvey, Kenneth P. Malvey Clinic, Bottineau
 Manzanero, F. M. McCannel Clinic, Minot
 Naegeli, Frank D. Northwest Clinic, Minot
 Nelson, Leslie F. Bottineau

Ohrt, Harry A. Kenmare
 Olson, Burton G. McCannel Clinic, Minot
 Richardson, Gale R. St. Joseph's Hospital, Minot
 Rowe, Paul H. Northwest Clinic, Minot
 Sciffert, G. S. Northwest Clinic, Minot
 Shea, Samuel E. McCannel Clinic, Minot
 Sorenson, Alfred R. Medical Arts Clinic, Minot
 Sorenson, Roger Medical Arts Clinic, Minot
 Towarnicky, Marvin J. Fessenden
 Uthus, O. S. 21½ 2nd Ave. S.E., Minot
 Vaaler, Raymond A. Great Plains Clinic, Minot
 Wall, Willard W. Northwest Clinic, Minot
 Wallis, Marianne St. Joseph's Hospital, Minot
 Wilson, Herbert J. New Town

Fifth District

Christianson, Gunder 117 N.W. 3rd, Valley City
 Goven, J. W. 117 N.W. 3rd, Valley City
 Jensen, Warren R. 130 Central Ave. S., Valley City
 Klein, C. J. 117 N.W. 3rd, Valley City
 Macdonald, Alexander C. 130 Central Ave. S., Valley City
 Macdonald, Neil A. 130 Central Ave. S., Valley City
 Merrett, J. P. 117 N.W. 3rd, Valley City
 VanHouten, J. 105 Main St. W., Valley City

Sixth District

Anderson, F. E. Underwood
 Arneson, Charles A. Missouri Valley Clinic, Bismarck
 Baumgartner, Carl J. Quain & Ramstad Clinic, Bismarck
 Benson, O. T. 1737 Whitley Ave., Hollywood 28, Calif.
 Berg, H. Milton Quain & Ramstad Clinic, Bismarck
 Berg, Roger M. Quain & Ramstad Clinic, Bismarck
 Bertheau, Herman J. Linton
 Blumenthal, P. L. 107 1st Ave. N.W., Mandan
 Bodenstab, William H. 520 Mandan St., Bismarck
 Boerth, Edwin H. Quain & Ramstad Clinic, Bismarck
 Brink, Norvel O. Quain & Ramstad Clinic, Bismarck
 Bryant, Emmett P. Capital City Clinic, Bismarck
 Buckingham, T. W. 405½ Broadway, Bismarck
 Cartwright, John T. Missouri Valley Clinic, Bismarck
 Cleary, Joseph W. Missouri Valley Clinic, Bismarck
 Curiskis, A. A. Elgin
 Dahl, P. O. Missouri Valley Clinic, Bismarck
 Diven, Wilbur L. 402½ Main, Bismarck
 Eriksen, Johan A. Quain & Ramstad Clinic, Bismarck
 Fisher, Albert M. 922 8th St., Bismarck
 Freise, Paul W. Quain & Ramstad Clinic, Bismarck
 Froeschle, Rudolph P. Hazen
 Gaebe, Otto C. New Salem
 Garrett, W. G. Missouri Valley Clinic, Bismarck
 Girard, Bernard A. Beulah
 Goughnour, Myron W. Capital City Clinic, Bismarck
 Gregware, P. Roy Quain & Ramstad Clinic, Bismarck
 Griebenow, Frederick 905 9th St., Bismarck
 Gutowski, Franz Wishek
 Hamilton, Charles A. Quain & Ramstad Clinic, Bismarck
 Hanson, Harris D. Quain & Ramstad Clinic, Bismarck
 Heffron, M. M. 405½ Broadway, Bismarck
 Henderson, Robert W. Capital City Clinic, Bismarck
 Hetzler, Arnold E. 104 3rd Ave. N.W., Mandan
 Icenogle, G. D. State Hospital, Jamestown
 Jacobson, M. S. Elgin
 Johnson, Kenneth J. Quain & Ramstad Clinic, Bismarck
 Johnson, M. J. E. Quain & Ramstad Clinic, Bismarck
 Johnson, Paul L. Quain & Ramstad Clinic, Bismarck
 Kalnins, Arnold Washburn
 Kling, Robert R. Quain & Ramstad Clinic, Bismarck

Knplis, Haralds Turtle Lake
 Larson, Leonard W. Quain & Ramstad Clinic, Bismarck
 Levi, Wesley E. Quain & Ramstad Clinic, Bismarck
 Lindelow, Olaf V. Missouri Valley Clinic, Bismarck
 Lipp, George R. 405½ Broadway, Bismarck
 Lommen, M. A. K. Capital City Clinic, Bismarck
 McGee, William J. 104 Missouri Drive, Riverdale
 Montz, Charles R. Quain & Ramstad Clinic, Bismarck
 Nuessle, Robert F. Quain & Ramstad Clinic, Bismarck
 Nugent, Milton E. Quain & Ramstad Clinic, Bismarck
 Oja, Karl F. Ashley
 Orchard, Welland J. Linton
 Orr, August C. Capital City Clinic, Bismarck
 Owens, Percy L. Missouri Valley Clinic, Bismarck
 Perrin, Edwin D. Quain & Ramstad Clinic, Bismarck
 Peters, C. H. Quain & Ramstad Clinic, Bismarck
 Peterson, Alice H. Division of Maternal Health,
 State Health Department, Bismarck
 Pierce, W. B. Quain & Ramstad Clinic, Bismarck
 Pierson, R. Warren Quain & Ramstad Clinic, Bismarck
 Quain, Eric P. 2075 Raynor St., Salem, Ore.
 Schoregge, Charles W. Quain & Ramstad Clinic,
 Bismarck
 Schoregge, Robert D. Quain & Ramstad Clinic, Bismarck
 Smeenk, H. Pieter Quain & Ramstad Clinic, Bismarck
 Smith, Cecil C. 101 Collins Ave., Mandan
 Smith, Clyde L. Missouri Valley Clinic, Bismarck
 Spielman, George H. 305 1st Ave. N.W., Mandan
 Stangebye, T. L., Jr. Quain & Ramstad Clinic, Bismarck
 Thompson, Arnold Quain & Ramstad Clinic, Bismarck
 Tudor, Robert B. Quain & Ramstad Clinic, Bismarck
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 Vinje, Ralph 405½ E. Broadway, Bismarck
 Vonnegut, Felix F. Linton
 Waldschmidt, R. H. Quain & Ramstad Clinic, Bismarck
 Walter, P. A. F. Hazen Clinic, Hazen
 Weyrens, P. J. Hebron
 Zukowsky, Anthony Ozone Bldg., Steele

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 Arzt, Philip G. 401 3rd St. S.E., Jamestown
 Beall, John A. 320 1st Ave. N., Jamestown
 Bolliger, Eugene F. Ellendale Clinic, Ellendale
 Craychee, Walter A. 205 Union Ave., Oakes
 Cukers, Paul State Hospital, Jamestown
 Elsworth, John N. DePuy-Sorkness Clinic, Jamestown
 Engberg, Roger D. DePuy-Sorkness Clinic, Jamestown
 Fandrich, Harry A. Carrington
 Fergusson, Victor D. Edgeley
 Gronewald, Tula W. State Hospital, Jamestown
 Harris, Theodore A. Medical Arts Clinic, Jamestown
 Hieb, Edwin O. DePuy-Sorkness Clinic, Jamestown
 Hogan, Clifford W. DePuy-Sorkness Clinic, Jamestown
 Jansonius, J. W. Medical Arts Clinic, Jamestown
 Jestadt, John J. DePuy-Sorkness Clinic, Jamestown
 Klassen, R. A. LaMoure Clinic, LaMoure
 Larson, Ernest J. DePuy-Sorkness Clinic, Jamestown
 Lucy, Robert E. DePuy-Sorkness Clinic, Jamestown
 Lynde, Roy Ellendale
 McFadden, Robert L. DePuy-Sorkness Clinic, Jamestown
 Melzer, Simon Woodworth
 Martin, C. S. Kensal
 Meunier, H. J. Oakes
 Miles, James V., Jr. Jamestown
 Nierling, R. D. DePuy-Sorkness Clinic, Jamestown
 Oster, Ellis Ellendale Clinic, Ellendale
 Pederson, T. E. DePuy-Sorkness Clinic, Jamestown
 Sorkness, Joseph DePuy-Sorkness Clinic, Jamestown
 Swenson, John A. DePuy-Sorkness Clinic, Jamestown

Thakor, S. J. State Hospital, Jamestown
 Tripp, Harry D. Florida State Hospital,
 Chattahoochee, Fla.
 Turner, Neville W. LaMoure
 Van der Linde, J. M. Medical Arts Clinic, Jamestown
 Van Houten, R. W. 301 Union Ave., Oakes
 Woodward, R. S. DePuy-Sorkness Clinic, Jamestown
 Young, John H. State Hospital, Jamestown

Eighth District

Borrud, Chester C. Harmon Park Clinic, Williston
 Craven, John P. 411 Main St., Williston
 Craven, Joseph D. 411 Main St., Williston
 Ellis, Gordon E. Harmon Park Clinic, Williston
 Fennell, William L. Crosby
 Hagan, Edward J. 411 Main St., Williston
 Johnson, Alan K. Williston Clinic, Williston
 Johnson, P. O. C. Watford City
 Keller, John M. Williston Clinic, Williston
 Knobloch, W. H., Jr. Tioga
 Korwin, J. J. 120 Main, Williston
 Lund, Carroll M. Williston Clinic, Williston
 McPhail, Clayton O. Crosby
 Pile, Duane F. Crosby
 Sathe, Andrew G. Harmon Park Clinic, Williston
 Skjei, Donald E. Williston Clinic, Williston
 Strinden, Dean R. Harmon Park Clinic, Williston
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Ninth District

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 Dukart, R. J. Dickinson Clinic, Dickinson
 Foster, Keith G. Rodgers-Gumper Clinic, Dickinson
 Gilliland, R. F. Dickinson Clinic, Dickinson
 Gilsdorf, A. R. Dickinson Clinic, Dickinson
 Guloien, Hans E. Dickinson Clinic, Dickinson
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 Hanewald, Walter C. Richardton
 Hankins, Robert E. Mott
 Hill, S. W. Regent
 Hilts, Joseph A. Hettinger
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 Larsen, Harlan C. Rodgers-Gumper Clinic, Dickinson
 Maercklein, Otto C. Mott
 Ordahl, Norman B. Rodgers-Gumper Clinic, Dickinson
 Raasch, Richard F. Dickinson Clinic, Dickinson
 Reichert, D. J. 24 W. Villard, Dickinson
 Reichert, H. L. 24 W. Villard, Dickinson
 Rodgers, R. W. R. Rodgers-Gumper Clinic, Dickinson
 Schumacher, William A. 12102 Silver Fox Road,
 Los Almitos, Calif.
 Slominski, Henry Richardton
 Smith, Oscar M. P.O. Box 1188, Dickinson
 Thom, Robert C. Bowman

Tenth District

Dekker, Omar D. Finley
 Kjelland, A. A. Hatton
 LaFleur, H. A. Mavville
 Little, James M. Mayville
 Little, Roy C. Mayville
 McLean, Robert W. Hillsboro
 Mergens, Daniel N. Hillsboro
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Department Urges Mantoux Test in Search for TB Cases

Almost twice as many tuberculin tests were reported to the Minnesota Department of Health in 1958 than in 1957. The total of 192,434 compares with 98,900 tests reported in 1957 and 39,414 in 1954, the first year the present reporting system was used.

A total of 6,007 (3 per cent) of the 1958 tests were positive, and no significant difference was noted in the percentage of male and female positives. Out of 91,920 males tested, 3,047 readings were positive. The 94,507 females tested turned up 2,960 positives.

Reports are received in the state health department twice a year from district and county public health nurses and others conducting group tuberculin tests, according to Dr. D. S. Fleming, director of the division of disease prevention and control. He attributes the greater number of tests reported in 1958 to more conscientious reporting rather than to more testing.

The bulk of the 1958 tests were conducted in 450 schools, 6 colleges, and 3 communities. Industry, Indian reservations, and nursing homes each accounted for two surveys. A rest home, a migrant workers' clinic, and a practical nurses' training school also participated in the testing program. The total on school testing programs is incomplete because 19 counties failed to list the number of schools involved.

A breakdown of test results by age groups shows a rising incidence of positive readings as age increases. Out of 21,965 6-year-olds given tuberculin tests, only 198, or less than 1 per cent, were positive. Of the 34,146 tested in the 15-19 group, less than 4 per cent (1,212) were positive readings.

Although fewer tests were given to older persons, the percentage of positive readings continued to rise. The 3,001 persons tested in the 30-39 age group showed 387 (13 per cent) positives. The 1,890 persons tested in the 50-59 age group produced 496 (26 per cent) positives, and 1,111 in the 60 and above group turned up 401 (37 per cent) positive readings.

Dr. Fleming urges more tuberculin testing in all age groups, particularly among older persons who are most likely to develop tuberculosis. Last year 90 per cent of the 102 persons who died of tuberculosis in Minnesota were 45 years of age or older. "The tuberculin test should be a standard procedure in health-screening examinations."

The 1958 figures show a greater percentage of positive readings in males than in females over the age of 15. Dr. Fleming says this probably can be explained by the fact that men usually have more opportunities for exposure to the disease because of normal occupational contacts or military service.

Very few of the children with positive Mantoux tests have active cases of tuberculosis, Dr. Fleming explains. The reaction simply means that the child has had contact with someone having an active case of the disease and has been infected. It does not mean he is ill with tuberculosis at present, but he could become ill at some time in his life. He should receive a chest x-ray, and his contacts should be traced to find any active cases, Dr. Fleming states.

The tests also can be used as an educational technic, Dr. Fleming points out. "We can inform children and their parents about the use, value, and necessity of the tuberculin tests for early case-finding in tuberculosis control and educate them on maintaining good health practices," he states.

Dr. Fleming points out that many tuberculin tests are performed each year by physicians in offices, hospitals, and other programs which are not reported to the state health department. He encourages submission of all such reports to the department.

FROM MINNESOTA'S HEALTH, June-July 1959

The Child with a Handicap, edited by EDGAR E. MARTNER, M.D., 1959. Springfield, Illinois: Charles C Thomas. \$11.00.

This book will fill a need long recognized by teachers of the "nonmedical" members of the treatment "team." There are excellent discussions of the general problems, relationship, and function of team members; specific disabilities; and directories of camps, schools, books, and materials. The book is easy to read and does not require technical or professional background in most sections.

Unfortunately, for a book of such good general quality which fills such an important need, the teacher will find it has certain serious faults. There are sections which appear not to have been proofread. The section on cerebral palsy seems to have been written in haste, is very uneven, and includes many misspelled and misused words. A similar problem exists in the section concerning children's eyes. For example, on page 320, "The affected parent has a one in four chance of transmitting the disease to 40-50% of his siblings." The section concerning the role of the teacher is not likely to be very helpful, and the approach in some other areas may be too elementary.

The section of the book entitled "The Child Who is a Mongol" contradicts the remainder of the book in its approach. The responsible person on the staff will need to point out to students and staff members who are unfamiliar with these children that the gross generalizations of "all these children" and "invariably" are pit-falls that Dr. Sanford should have avoided, since the expression of the various symptoms of this symptom complex varies, and these children do not all have personalities struck from the same mold. It may not be proper to criticize the title, since the term "Mongol" is recognized for this problem, but it would appear better usage to have used the traditional and linguistically more correct term "mongoloid."

H. M. STERLING, M.D.

•
What We Do Know About Heart Attacks, edited by JOHN W. CORMAN, M.D., 1958. New York: G. P. Putnam's Sons. \$3.50.

This book is for the intelligent layman who does not have known heart disease but who is curious concerning heart attacks and their predictability and the possibility of their prevention.

BOOK REVIEWS

After discussing coronary arteriosclerosis and atherosclerosis and their disease manifestations, the role of lipoproteins and other fatty substances is taken up. Most of the book is devoted to the consideration of the classes of lipoproteins and their relationship to the frequency of coronary artery disease. The attempt is to integrate with the use of an atherogenic index the level of fatty substances with known clinical facts, such as the increasing number of heart attacks in aging persons and the decreased frequency in younger women, the unfavorable influence of high blood pressure and of diabetes mellitus, and the high frequency of coronary disease noted in certain families.

There are also chapters on diet, cigarette smoking, emotional stress, and occupational and physical activity with a program for attempted prevention of heart attacks.

This book should be stimulating to the layman who seeks current trends in regard to coronary disease with the realization that the last word has yet to be said concerning this disease condition.

C. A. MCKINLAY, M.D.

○
The Plasma Proteins, Clinical Significance, by PAUL G. WEIL, M.D., Ph.D., 1959. Philadelphia: J. B. Lippincott Co., 133 pages. \$3.50.

In this very brief monograph, the author has attempted to acquaint physicians with the great advances that have been made in the past fifteen years in the wide range of diseases in which abnormalities of the plasma proteins can be detected. He has been successful in presenting a general picture of a wide variety of protein disturbances.

The material in this pocket-sized book is presented in a readable fashion. However, the scope is so vast that the reader can achieve only a slight acquaintance with the variations in the plasma proteins that have been intensively investigated in recent years. A single author can

scarcely be thoroughly conversant with all of the fields that are included. Certain errors of interpretation in admittedly narrow segments are discernible. The book does serve a useful purpose, namely, an introduction to the clinical significance of the plasma protein variations as they can be detected by modern laboratory methods.

F. W. HOFFBAUER, M.D.

•
The Lung, Clinical Physiology and Pulmonary Function Tests, by J. H. COMROE, JR., R. E. FORSTER, II, A.B. DuBOIS, W. A. BRISCOE, and E. CARLSEN, 1959. Chicago: The Year Book Publishers, Inc., 219 pages. \$5.50.

This monograph was written for the medical student and the practicing physician. It was not written for the pulmonary physiologist, although many in this category have found it very helpful and a very useful addition to the literature. The authors do a remarkably fine job of explaining first the physiologic principles involved and the background for pulmonary function tests and then when and how these tests are performed. The book does not provide precise details of technic and procedure in administration of pulmonary function tests but refers to other sources which do.

The book is divided into three parts. The first section, which is the longest, deals with pulmonary physiology. Mathematical formulas are kept to a minimum and diagrams are used profusely throughout the section to illustrate and explain concepts. The diagrams are very well done and make it possible in most instances to grasp at a glance the principle involved. In the second part, the use of pulmonary function tests is illustrated with actual clinical cases. The results of lung function tests on 10 patients are given, and a diagnosis is made on the basis of an interpretation of the results of the pulmonary function tests. Part Three presents data and the equations in common use by pulmonary physiologists. This section is added for the individual who prefers equations to diagrams, and it is likely to be of more use to the individual in the laboratory than to the practicing physician.

An enormous amount of work has been done in the field of pulmonary physiology in the past two decades, and this book treats the new concepts and methodology in an excellent fashion.

E. B. BROWN, JR., Ph.D.

(Continued on page 25A)

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References: 1. Burrell, Z. L., et al.: Am. J. Cardiol. 1:624 (May) 1958. 2. Hutcheon, D. E., et al.: J. Pharmacol. & Exper. Therap. 118-451 (Dec.) 1956.

BOOK REVIEWS

(Continued from page 23A)

Temporal Lobe Epilepsy, by MAITLAND BALDWIN, M.D., and PEARCE BAILEY, Ph.D., M.D., 1958. Springfield, Illinois: Charles C Thomas, 581 pages. \$15.50.

In November of 1954 at Marseille, France, the first international colloquium concerning normal, pathologic, and anatomic problems raised by epileptic discharges was convened. An eminent group of international scientists were brought together to exchange ideas and compare evidence on the relationship between pathologic and histologic changes and epileptic discharges. In view of the interests of the electroencephalographers, neurologists, and neurosurgeons who attended this meeting, the main body of the discussion centered around so-called psychomotor or temporal lobe epilepsy. In the final sessions of the colloquium, the participants formulated a set of tentative conclusions, and among these conclusions was the decision to hold a second colloquium in 1957 to review the progress that had been made after further testing of the Marseille formulations. The second colloquium was held under the auspices of The National Institutes of Neurological Diseases and Blindness in March 1957 in Bethesda, Maryland. The present volume represents the published proceedings of that second colloquium.

An equally distinguished group of contributors was assembled in Maryland. Although considerably more material on anatomic correlations was brought to this meeting, a much greater emphasis was placed upon neurophysiologic and electrocorticographic investigations. The conference was divided into three major sections: (1) the neurophysiology and pathophysiology of temporal lobe epilepsy, (2) a review of pathogenetic and pathologic findings, and (3) treatment (primarily surgical) of temporal lobe epilepsy. An evening discussion by Dr. Donald B. Tower also presented the evidence for a neurochemical basis of seizures.

Although it was inevitable that there should be much discussion and disagreement over basic problems in the classification of psychomotor epilepsy, the volume as a whole presents perhaps the best available compendium of the vast experimental and clinical data relating to temporal lobe epilepsy. In addition to the published papers and the discussions, the extensive bibliographic

references make this volume an extremely valuable source material for all physicians who are involved in dealing with the convulsive disorders.

FRANK MORRELL, M.D.

A Primer in Medical Technology, by PAUL M. KRAEMER, 1958. Springfield, Illinois: Charles C Thomas, 338 pages. \$7.75.

As stated by the author in the preface, this book consists of 20 lessons in laboratory work designed to help nursing students, second year medical students, and those persons in laboratory work who have entered the field by other than the more usual educational channels. The lessons cover urinalysis and kidney function, hematology, blood chemistry, and cerebrospinal fluid. An introduction is given to blood banking. No lessons are included in bacteriology, serology, or parasitology. The book is not intended to cover laboratory techniques completely nor to cover the included areas in detail. It is a primer or elementary textbook.

The book is written so that it can be easily understood by the person with a limited background. In the discussion, the importance and use of laboratory procedures is combined with basic chemistry and physiology. Although the author refers to specific methods for many tests, references are not given. The section on blood sampling and other references to errors in procedure are covered well in a textbook of this scope. There are, however, some errors both in printing and in information. On page 219, a chart matching O, A, B, and AB cells with serum derived from these same 4 blood types indicates that clumping occurs when B cells are mixed with serum from a type B person and that no clumping occurs when B cells are mixed with serum from a type A person. These two responses should be reversed. As previously indicated, the author discusses blood sampling and other errors in laboratory procedures; he also, however, recommends the use of commercially precalibrated machines. The potential source of error in such a practice is considerable. Other errors noted in reviewing the book are the lack of quantitation in preparing the urine sediment for microscopic examination, nonuse of a coverslip in examining the sediment, incomplete tube labeling, and the incorrect interpretation of the state

of direct and indirect acting bilirubin.

The book would be more useful if source references were included.

VERNA RAUSCH, M.S.

Intracranial Calcification, by FERMO MASCHIERPA and VINCENZO VALENTINO, 1959. Springfield, Ill.: Charles C Thomas Co., 150 pages. \$9.50.

As Dr. McRae has stated in the foreword, there has long been a need for an English language monograph concerning intracranial calcification, and this atlas fulfills the need. It is profusely illustrated, and most of the roentgenograms are of excellent quality. As is customary in European publications, the radiographs are produced in the positive, thus contrasting somewhat with roentgenograms as they are usually observed.

The subject matter is divided into two parts: nonpathologic calcifications and those of pathologic significance. As might be anticipated, no laboratory proof of the diagnosis is offered in some of the nonpathologic types and the authors express their own theories concerning the origin and development of these deposits. Their descriptions, however, are helpful in forming a judgment as to whether a calcification is of clinical significance.

The much larger second part of the book (on pathologic calcifications) is divided conveniently into presentations of the nontumoral and tumoral types. For each type the authors present pathologic considerations, roentgenographic illustrations, and comments concerning the significance and diagnosis of the lesions. The cases presented have been selected well, and there are references from both European and American sources. As might be anticipated, the text suffers slightly from translation difficulties, in that sentence structure and use of English are slightly different from the style customarily found in American and English textbooks.

In addition to being a useful atlas for the practicing radiologist, this volume should be most helpful for graduate students in radiology, for it presents in a convenient manner the appearances of a number of lesions containing calcium, which one would have difficulty assembling from the files of even a large institution. It should be of considerable and frequent help to the radiologist, neurosurgeon, and neurologist.

COLIN B. HOLMAN, M.D.

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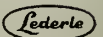
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News Briefs . . .

North Dakota

DR. A. MALCOLM CAMERON and DR. JENS SAHL recently joined the staff of the Northwest Clinic in Minot. Dr. Cameron, a specialist in chest and heart surgery, practiced general surgery for about five years at Delaware Hospital in Wilmington and spent two years in chest and heart surgery at the University of Michigan Hospital. His father, Dr. A. L. Cameron, is director and one of the founders of the Northwest Clinic. Dr. Sahl's association at the clinic is actually a return, since he practiced there for a year before leaving in 1954 for Iowa where he practiced general surgery for four and one-half years.

* * * *

DR. JOHN FREEMAN, former clinical director and, for a time, acting superintendent of the Jamestown State Hospital, has accepted two posts in Nebraska. He has been named assistant professor of neurology and psychiatry at the University of Nebraska College of Medicine and research psychiatrist at the Nebraska Psychiatric Institute at Omaha. In the latter position, Dr. Freeman has charge of a 10-bed research unit, which is devoted to teaching and research in connection with patients admitted from any of the three state hospitals in Nebraska.

* * * *

DR. JOHN YOUNG, whose resignation as director of the outpatient clinic at the Jamestown State Hospital became effective July 15, has accepted a similar position at the Traverse City State Hospital in Michigan. Dr. Young started the outpatient clinic at the Jamestown hospital shortly after his arrival in 1954.

* * * *

Minnesota

PROGRESS HAS BEEN REPORTED in the long-range program for expanding Riverview Memorial Hospital in St. Paul. The first step in the program was completed in 1957 when the hospital opened a new 20-bed wing. The next part of the project will begin in 1961 and will include new obstetrics, physical therapy, and dietary departments as well as a heating plant and room for 52 more beds. In 1965, the older section of the hospital will be dismantled and another 32-bed area, x-ray laboratory, and pharmacy will be added. The final stages, to take place in 1970 and 1975, will provide more beds, an administrative area, and storage space.

* * * *

DR. WILLIAM B. MARTIN and DR. JOSIAH FULLER are the first Duluth physicians to become recipients of a research grant from the Minnesota Heart Association. The \$2,050 grant will support a project entitled "The Effect of Disturbances in Cardiac Rhythm on Blood Flow through Atrial Septal Defects." So far as is known, no other researchers have conducted experiments on this subject.

THE FOLLOWING Mayo Clinic physicians have been awarded research grants from the Minnesota Heart Association: Dr. Earl H. Wood, of the physiology section, received \$5,700 for research into "Hemodynamic Effects Variable Degrees of A-V Asynchronism;" Dr. John Shepherd, of the physiology section, \$3,250 for study of "Changes in Heart Rate and Stroke Volume with Graded Exercise in the Dog and Man;" Dr. David E. Donald, of the physiology section, \$4,050 for research into "Study of the Conditions of Temperature, Gas Tension, and Hydrostatic Pressure Associated with the Release of Gas Bubbles from Extracorporeally Oxygenated Blood;" Dr. Mark B. Coventry, of the section of orthopedic surgery, \$1,200 for study of "Vascular Anatomy of the Foot," and Dr. F. Ellis, Jr., surgeon, \$3,650 for "Development of a Synthetic Intracardiac Valve."

* * * *

DR. WALTER A. FANSLER, emeritus clinical professor of surgery at the University of Minnesota, was made an honorary member of the Royal Society of Medicine (Proctologic Section) at the joint meeting of the Royal Society of Medicine and the American Proctologic Society in London on July 1, 1959.

* * * *

DR. FRANK H. KRUSEN, who founded the Section of Physical Medicine and Rehabilitation at the Mayo Clinic in 1935, has been appointed special assistant for health and medical affairs to the director of the Office of Vocational Rehabilitation of the Department of Health, Education, and Welfare. Dr. Krusen will assume the new post about September 15 on the basis of a three months' leave of absence from the clinic. He will remain a member of the clinic staff.

* * * *

DR. CHARLES A. NEUMEISTER, clinical assistant professor in the Department of Surgery, Division of Proctology, University of Minnesota, was a guest speaker at the South Texas Postgraduate Medical Assembly in Houston, Texas, on July 20.

* * * *

DR. FLETCHER A. MILLER, of Minneapolis, has been named director of surgical research and teaching at Mount Sinai Hospital, Minneapolis. Dr. Miller will continue to hold his title of professor of surgery at the University of Minnesota.

* * * *

DR. JOHN T. ROSE, of Lakefield, was honored recently by the community which he has served for forty-six years. More than 600 persons paid tribute to the doctor at a recognition dinner. The occasion marked Dr. Rose's fiftieth anniversary of his graduation from medical school. A round-trip ticket to Alaska for Dr. Rose and his wife was one of several presentations the doctor received.

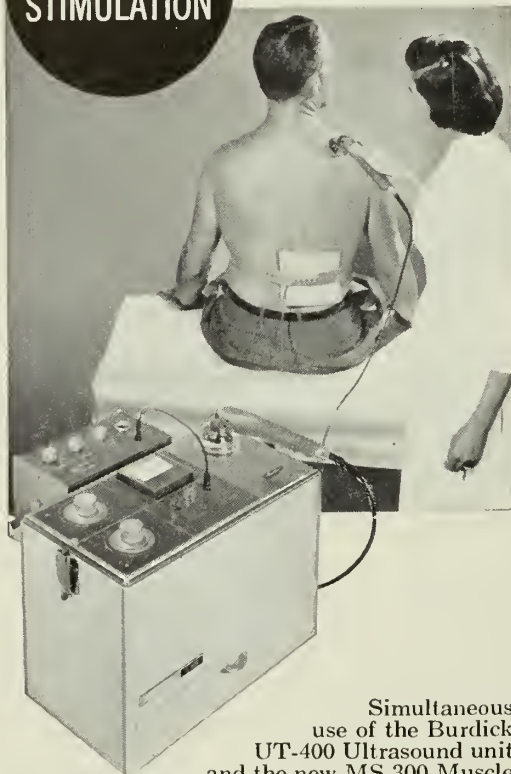
(Continued on page 28A)

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NEWS BRIEFS

(Continued from page 27A)

DR. ARTHUR B. SUNDBERG and Dr. G. W. Kuss were recently welcomed to Heron Lake by residents of the community who turned out in large numbers to attend a picnic given in honor of the physicians. At the same time, Dr. CAROL PLOTT, who will leave Heron Lake to enter surgical practice in Iowa, was honored for extraordinary services he has rendered the community. After a potluck supper, Dr. Sundberg and Dr. Kuss were introduced and Dr. Plott and his family were extended every good wish for their new venture in Iowa. A program of band and vocal music and square dancing followed.

* * *

MAJOR CRAIG W. FREEMAN, who has served as chief of the Pathology Division and Job Service Section of the Third United States Army Medical Laboratory at Ft. McPherson, Georgia, since 1957, has returned to private medical practice in Minneapolis. While with the Third Army Headquarters, Major Freeman developed the use of radioisotopes for therapeutic and diagnostic purposes in the Army area.

* * *

DR. CLEON R. HOLLAND, a member of the Mayo Clinic staff since 1958, has left Rochester to practice in Plainview. For the past year, Dr. Holland has been consulting physician in the emergency and admitting rooms at St. Mary's Hospital, Rochester. Dr. Holland entered the Mayo Foundation as a fellow in surgery January 1, 1954, and was appointed to the clinic staff July 1, 1958.

* * *

DR. JOHN R. PETERSON established practice in Rushford early in July. A graduate of the University of Oregon Medical School, Dr. Peterson interned at Ancker Hospital, St. Paul, and then spent two years in the Air Force. He is interested in surgery and plans to devote as much time as possible to that field.

* * *

DR. GRACE M. ROTH, a member of the Mayo Clinic since 1937, retired from active service in that institution July 1. She has devoted her career to physiology in relation to certain disease states, chiefly circulatory, and has contributed some 146 papers to the medical and scientific literature. Dr. Roth's plans for the future are not complete, but she has indicated that she will continue research at some medical center.

South Dakota

DR. JAMES L. RICHIE, a specialist in surgery, has become associated in practice with Dr. Harold J. Grau and Dr. Richard Finley in Rapid City. A graduate of the University of Colorado School of Medicine, Dr. Richie interned and was a resident in surgery at San Joaquin General Hospital, French Camp, California. He also served as surgeon on the staff of Madera County Hospital in Madera, California, and then entered private practice in San Francisco.

(Continued on page 30A)



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NEWS BRIEFS

(Continued from page 28A)

DR. FORREST SCHROEDER recently opened practice in the offices of Dr. Lyle Hare in Spearfish. A graduate of the University of Wisconsin Medical School, Dr. Schroeder interned at Deaconess Hospital in Great Falls, Montana. After serving in the Army Medical Corps from 1954 to 1956, he practiced in Eureka, Montana, until last December. From January until the middle of May, he was on the staff of Homestake Hospital in Lead.

DR. F. W. VALKENAAR retired July 1 after fifty-two years of dedicated service to the community of Chancellor. Two years ago, residents of the area paid tribute to the doctor at a special program held in the Chancellor auditorium. During his long years of service, Dr. Valkenaar spent little time away from his practice. He will now be able to take a well-deserved and long overdue vacation.

Deaths . . .

DR. CONRAD A. NEUMANN, 77, who practiced for many years in Lewiston and Winona, Minnesota, died July 6. Dr. Neumann practiced in Lewiston from 1909 to 1927, when he joined the staff of the Winona Clinic. Twenty years later, he retired from the clinic and resumed practice in Lewiston. In 1937, Dr. Neumann was elected to the American College of Surgeons. Last May, he was admitted to the Fifty-Year Club of the Minnesota State Medical Association in recognition of half a century of practice.

DR. CHARLES P. ROBBINS, 87, a physician in Winona, Minnesota, for more than sixty years, died July 15. He had been in poor health for several years. Dr. Robbins established and directed the first x-ray department at Winona General Hospital and was the first president of the Winona County Health Association.

DR. L. GORDON SAMUELSON, 55, who practiced in Mankato, Minnesota, for twenty-five years, died suddenly July 16 in St. Peter. Currently, Dr. Samuelson was a psychiatrist at the St. Peter State Hospital. He was recently elected president of the Minnesota State Hospital Physicians.

DR. JOSEPH R. TRUSCOTT, 88, who had been a physician in Fargo, North Dakota, for fifty-four years, died June 27 in Northwood, North Dakota. Dr. Truscott resided in St. Petersburg, Florida, after his retirement in 1955 but recently returned to North Dakota to be near his friends. In 1947, he was honored at a recognition day. In addition to his medical practice, Dr. Truscott was interested in the early history of the state and was an honorary life member of the North Dakota Historical Society.

DR. JOHN A. TIMM, 69, died July 22 at the farm home of his brother near Altura, Minnesota. A native of Altura, he was a graduate of the University of Minnesota, and was a surgeon in Brooklyn, New York, from 1918 until his retirement due to ill health two years ago.

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*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings*

- The complete, comprehensive rehabilitation center which provides an integrated program of medical, psychologic, social, and vocational evaluation and services under competent medical supervision serves the total patient. Not only must he be trained in the use of his artificial limb, but he must have an understanding of how to deal with the related social, emotional, and economic problems arising from his handicap. Dr. Frank H. Krusen, Mayo Clinic, and his associates describe the combined efforts of public and private agencies in this field in a report on "The Minnesota Plan for Rehabilitation of the Handicapped."

- Discussion of complete heart block and the use of a bipolar myocardial electrode is described in a paper from the Cardiac Research Laboratory, St. Joseph's Hospital, St. Paul, by Samuel W. Hunter, M.D., Dominic Bernardez, M.D., J. Larry Noble, M.D., and Norman A. Roth. The authors point out that in the permanently blocked heart following heart surgery, this technique offers a method of obtaining prolonged artificial stimulation.

- In the continuation of the Special Series on Cardiovascular Disease, John F. Briggs, M.D., guest editor, in his paper on "Extra-Cardiac Factors in Cardiac Disease" points out that there are a great many extra-cardiac conditions which express themselves in whole or in part through the cardiovascular system. These symptoms may be so great that they overshadow the basic symptoms of the original extra-cardiac disease, and thus, this basic condition may be overlooked. The recognition of these extra-cardiac influences is extremely important in the management and control of heart disease.

- In the same series, Donald B. Swenson, M.D., and Joseph F. Borg, M.D., in a paper on the "Diagnosis and Treatment of Subacute Bacterial Endocarditis," point out that errors in diagnosis leading to delay in therapy, as well as inadequate treatment of patients with resistant organisms, are the factors accounting for the majority of failures in subacute bacterial endocarditis.

- "... it is through the reading of [your] article that I obtained the original idea for the isolation of insulin," wrote Dr. F. G. Banting of Toronto to Dr. Moses Barron of Minneapolis in 1934. In a special biographical sketch, Dr. E. T. Bell, professor emeritus, University of Minnesota, writes of the many contributions of Dr. Barron, scientist, medical practitioner, teacher, and humanitarian.

Meetings and Announcements

CONTINUATION COURSES

The following medical continuation courses will be presented at the University of Minnesota Center for Continuation Study:

Nov. 2-6—Gastrointestinal radiology for radiologists.

Nov. 16-18—Fractures for general physicians.

Nov. 19-21—Physical medicine for specialists.

Jan. 11-13—Ophthalmology for specialists.

Jan. 21-23—Surgery for surgeons.

For further information write to the Director, Department of Continuation Medical Education, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14.

UNDERGRADUATE CONTEST

The American College of Chest Physicians is offering three cash awards—\$500, \$300 and \$200—to winners of the 1960 prize essay contest, open to undergraduate medical students throughout the world. Essays may be written on any phase of the diagnosis and treatment of chest diseases (cardiovascular or pulmonary). For further information write to American College of Chest Physicians, 112 East Chestnut Street, Chicago 11, Ill., U.S.A.

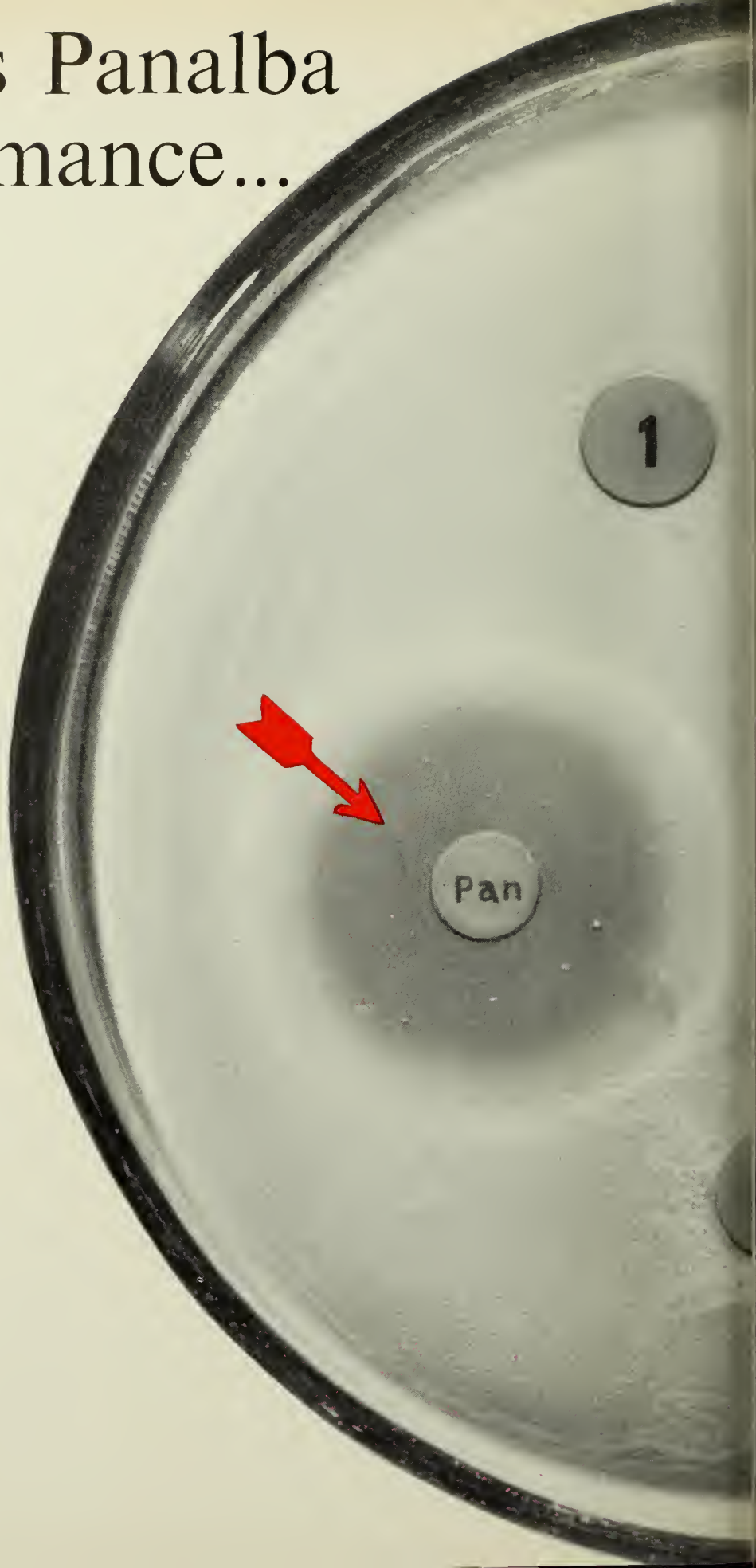
WISCONSIN RESPIRATORY CENTER

The University of Wisconsin has opened a Respiratory and Rehabilitation center in University hospitals aimed at restoration of disabled patients to the greatest possible physical, mental, social, and vocation capacity. A Wisconsin physician may refer to the center a polio patient, an accident victim or any person suffering a severely disabling disease or injury which demands long-term reorganization of the patient's life. Dr. Arthur Siebens is director, Dr. Theodore Bruns assistant director.

UNIVERSITY OF MINNESOTA DERMATOLOGY COURSE

A continuation course in dermatology for general physicians will be given Oct. 22 to 24 at the center for continuation study. Diagnosis and management of skin disorders most frequently seen in general practice will be emphasized.

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Observations on the Therapy of Leg Ulcers

RAYMOND O. BRAUER, M.D.

Houston, Texas

AN ULCERATION is a loss of cutaneous tissue caused by death of the superficial structures. Should the body reparative processes fail, the ulceration persists and becomes an ulcer.

The causes of ulcers of the legs may be listed as follows: (1) radiation, (2) trauma or osteomyelitis, (3) carcinoma, (4) arterial insufficiency, (5) bacterial infection, (6) neurogenic, (7) nutritional, (8) decubitus, and (9) stasis or venous ulcer.

CLASSIFICATION

Ulcers may be classified into those in which treatment is well understood and standardized and those in which treatment is not well standardized. The first classification includes ulcers caused by the following:

1. *Radiation.* These ulcers are usually characterized by a grayish white indolent slough in the bed,¹ with no evidence of granulation tissue forming around the margins or in the bed. They are also characterized by severe pain, many times apparently all out of proportion to the appearance of the ulcer. This is especially true if the ulcer is small. Usually, the diagnosis can be made from the history, but, occasionally, on an extremity on which fluoroscopy has been used in the reduction of fractures or repeated roentgenograms have been taken in a limited area, an ulcer can develop after several days. The etiology of such ulcers may be very obscure, but, radiation should be suspected by the appearance of the ulcer. The proper treatment is excision and split-skin grafting if the bed will permit these procedures, but, if the excision extends

down to nerves, bone, or tendons, coverage with a cross leg or arm flap, as shown in figures 1 and 2, is indicated.

2. *Osteomyelitis.* This type of ulceration usually follows the treatment of a compound fracture in which there has been loss of soft tissue overlying the bone. This so-called ulcer presents exposed bone in the depths of the wound. Treatment of this condition requires a sequestrectomy with saucerization down to normal bleeding bone. The cavity is allowed to develop granulation tissue before it is covered with a split-skin graft. This results in a healed defect which can be covered with a flap in preparation for necessary bone grafts.

3. *Carcinoma.* This condition usually develops in burn scar ulcers which have been present many years and finally undergo malignant change. The diagnosis can be suspected by the papillary overgrowth. The treatment depends on the extent of the lesion and varies from wide excision and split-skin grafting to amputation.

4. *Bacterial infection.* Tuberculosis or syphilis produces ulcers which are rarely seen today.

5. *Neurogenic.* These lesions are most frequently seen on the feet or lower extremities in individuals who have lost sensory nerve supply to the part.

6. *Nutritional.* Ulcers of this etiology usually mean diabetes. The destruction quickly extends to the deep structures, which are very slow to separate, and further complicates the control of the diabetes. Local treatment is surgical debridement and coverage with a graft or flap.

7. *Decubitus ulcers.* These are the problem of the paraplegic patient, and probably the best treatment is prevention. They are usually due to poor nursing care when the patient is allowed

RAYMOND O. BRAUER is a specialist in plastic surgery with offices in Houston.



Fig. 1. Radionecrosis of the leg.

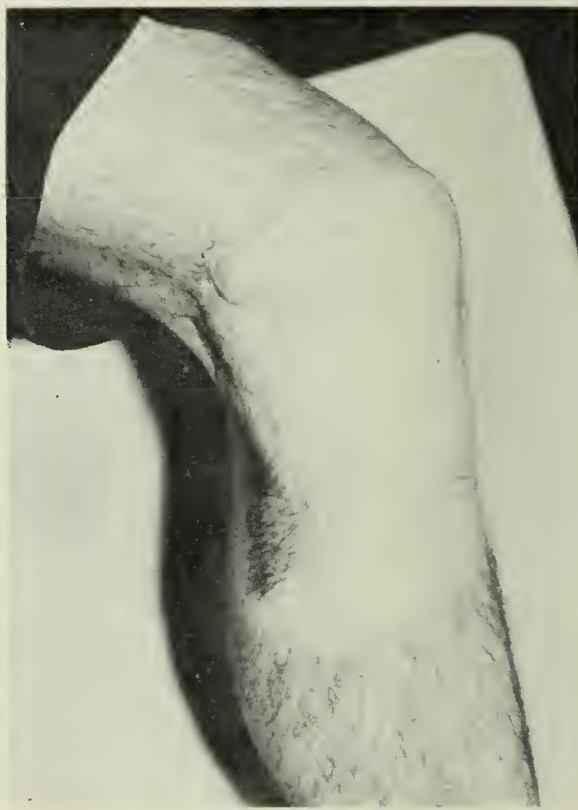


Fig. 2. Radionecrosis after coverage with an arm flap.

to rest on a bony prominence for an abnormal period of time. They occur over the external and internal malleoli, and, until the nursing problem can be corrected and the patient educated regarding their prevention, it is probably best not to attempt any reconstructive procedures. The treatment is surgical excision and closure with a local flap.

8. *Ulcers of burn scar origin.* These ulcers may develop after the part has completely healed, or they may be an aftermath of the burn itself, as in cases in which the individual has not had the opportunity or benefit of split-skin grafting.

Ulcers in which treatment is difficult or less well standardized are those caused by the following:

1. *Arterial deficiency.* These ulcers are usually scattered, local, punched out lesions. The foot as a whole is a beefy or violaceous red color with a dry, slick, shiny appearance. The ulcer itself in some respects resembles the radiation ulcer and has little tendency to heal.

2. *Venous stasis origin.* This anomaly was first pointed out by John Gay in 1867,² but we owe the explanation primarily to John Homans,³ who

first established relationship between previous deep vein thrombosis and ulcers of the leg.

ANATOMY

The vein's wall is composed of muscular and elastic endothelial layers. Valves are located in both the superficial and deep veins, and the number and position of these valves vary. One or two valves in any stretch of the vein is considered normal.

Anatomy of the veins of the leg muscles. In the soleus muscle are a series of large venous sinuses within the muscle which are devoid of valves, and these are the sinuses in which a deep thrombosis very often starts.⁴ These sinuses drain by very short, lax veins into the posterior tibial and peroneal veins, so that nearly all of the venous drainage of the lower one-half of the calf goes directly into the posterior tibial. The peroneal vein is quite small and joins the posterior tibial to form the popliteal vein. In the lower third of the leg where the posterior tibial receives the two lowest muscular veins it also receives two large perforating veins from the subcutaneous tissue draining the entire malleolar region.

Fig. 3. The 3 groups or branches of the long saphenous vein with the most important—No. 3, the posterior arch vein—shown with its 3 perforators.

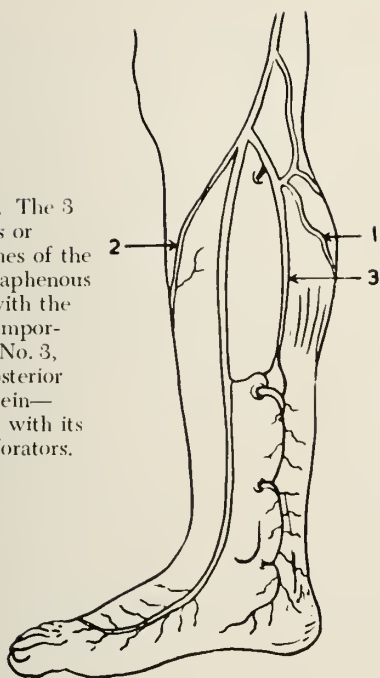
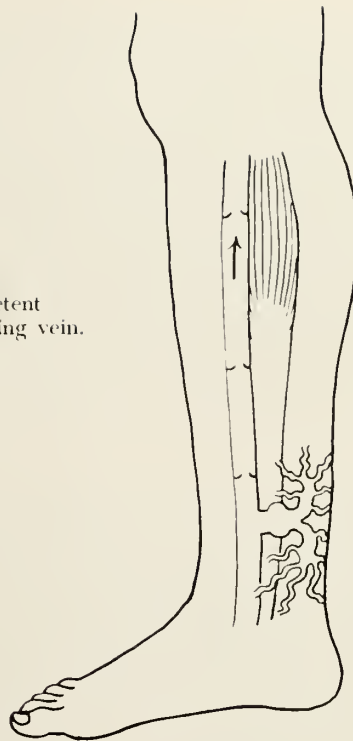


Fig. 4. Incompetent perforating vein.



Each belly of the gastrocnemius muscle is drained by a large single vein which enters the popliteal vein in the lower part of the popliteal fossa.

Anatomy of superficial and communicating veins. The peculiar consistency of the occurrence of ulcers of venous origin, whether varicose or post-thrombotic, just above or behind the internal malleolus, is based on the anatomic arrangement of this area.

The great saphenous vein is a thick walled, muscular structure and, as far as the leg is concerned, runs from just below the knee to the ankle with no major branches until just below the ankle where it rapidly breaks up into a series of branches draining the subcutaneous tissues of the foot. Its branches, however, are thin walled and easily yield to dilation. As seen in figure 3, there are three groups or branches of the long saphenous vein at the knee: the anterior, posterior, and, most important, the posterior arch vein, which is No. 3 in the illustration. This posterior arch vein passes down the inner and posterior part of the leg to anastomose with the three perforating veins which empty directly into the posterior tibial veins. Of great importance, as mentioned before, is the fact that these perforating veins, the upper and middle, enter the posterior tibial vein at the same point at which the large veins draining the soleus muscle enter.

On the short saphenous vein, there is a perforating vein which also empties into the posterior tibial vein, which explains the typical location of an ulcer on the outer side of the leg.

This particular arrangement explains how a thrombosis beginning in the sinuses of the calf muscles may spread up into the posterior tibial vein or outward through the perforator into the peripheral venous circulation. This is also the reason why the site of election for cutaneous sequelae of deep thrombosis is so often on the inner side of the leg in the malleolar region and not the outer side.

PATHOLOGY

Normally, the flow of blood in the leg is from the superficial to the deep with the valves arranged to this end. The mechanism of a calf pump in returning the blood from the leg in the erect position is well known. When the calf muscles contract against the firm investing layers of the deep fascia, the venous blood is squeezed upward with considerable force. It is prevented from leaking out of the pump by valves of the perforating veins. This pressure has been measured by Wells and associates,⁵ who showed that in the lower third of the leg the venous pressure rose to 90 mm. on contraction.

This means that when the perforating veins are incompetent as shown in figure 4, with each



Fig. 5. A true varicose ulcer secondary to rupture of a small venule. It is small and unless complicated heals quickly. Note 2 or 3 other dark venules nearby.



Fig. 6. Typical postphlebotic ulcerations with thick, leathery skin and pigmentation.

contracture of the leg muscles, the venous pressure is pushed superficially out into the branches of the long saphenous system on the inner part of the leg. This explains the devastating effect on the subcutaneous tissues in the immediate vicinity of the incompetent perforating vein and can form the basis for treatment of some of these ulcers if carried out at the proper stage.

Local pathology. Ulcers of venostasis origin are usually classified under two types: varicose and postphlebotic.

1. *Varicose.* The true varicose ulcer, as shown in figure 5, often begins as a small area of necrosis caused by rupture of a small venule or by trauma and unless complicated by arteriosclerosis or infection will heal rapidly.⁶ These ulcerations are usually related to varicosities, are small, and in the beginning do not involve the deep fascia. It should be noted that, while the varicose ulcer may have started as a local disease in the

vein, associated tissue changes are permanent and irreversible, and the ulcers may continue even after complete eradication of the associated varicosities. In any event, the breakdown of these veins results in venous congestion in some areas.

2. *Postphlebotic.* Thrombophlebitis denotes primarily a disorder of the wall of the subcutaneous veins followed by obliteration of the vein and eventual recanalization. This process can begin in the peripheral veins and extend into the perforators, resulting in a valveless perforating vein.

Acute thrombosis of the deep veins is a term synonymous with phlebothrombosis. In acute thrombosis, the clotting of the blood is the primary factor, and the wall is involved secondarily. Thrombosis usually arising in one of the sinuses of the soleus muscle can project into the large trunks or secondarily involve the perforating veins, or the thrombosis may break loose as an embolus. Once the vessel wall is completely occluded, it gives rise to phlebitis with fever and tenderness over the area.⁷ Such involvement in the deep system with spread to the perforating veins results in breakdown of the perforating veins and venous congestion in the periphery.⁸

However, whether the process stems from trouble from within the deep system or trouble from the superficial system, after a certain period, the local picture as far as the skin on the inner third of the leg and the underlying subcutaneous tissue is concerned is much the same except for the degree of involvement. When the perforating veins have become affected, the severity is much greater because of the muscle pump action previously mentioned.⁹

Postphlebotic ulcerations present marked swelling, induration, and edema with pigmentation of the lower leg. In the presence of a longstanding or recurring ulcer, certain morbid conditions exist which are much the same whether the ulcer was originally varicose or postphlebotic in origin. Venous stasis with blood stagnation occurs very early, resulting in local anoxia, accumulation of toxic metabolites, and tissue acidosis. When the collateral circulation around an area of phlebitis or simple varicosity is not sufficient to carry away the metabolites, there is chronic irritation of the skin with pigmentation and edema (figure 6). The skin in this area may become thin and shiny or thick and leathery. The subcutaneous tissues are replaced by scar and in time will involve the deep fascia. The only difference between the varicose and the postphlebotic process is in the extent of the severity and the rapidity of the onset. Initially, this is a labile area simply waiting for the slightest trauma

or the rupture of a vein to produce an ulcer. Once this occurs, there is local death of tissue with lymphangitis, cellulitis, and edema. At first, this process is localized with periods of complete healing. When it recurs, the process becomes chronic and each repeated attack of ulceration and trauma serves to aggravate the ulcer. A vicious cycle is set up as the scar tissue forms around the ulcer interfering with the local arterial supply as well as maintaining the venous sump. The recurring acute episodes result in an ever widening area and, on occasions, even the entire lower calf of the leg is completely encircled. In the beginning, the primary problem may have been one of varicosity but, once the vicious cycle occurs, the condition becomes self-perpetuating, which is an entity in itself and accounts for some of the failures in treatment.

The importance of trauma has not been emphasized sufficiently because early in the process trauma is usually the precipitating factor in the formation of both the initial and the recurring ulcer.

VENOGRAPHY

The results of venographic examination of veins of the leg have been variously interpreted and are somewhat controversial. It was Bauer's⁷ opinion that any retrograde flow demonstrated by venography represented a valvular incompetence of the deep veins.

However, Cockett⁴ demonstrated in 6 young adults that retrograde flow of dye can occur past normal valves and does not constitute grounds for a diagnosis of valvular incompetence. In his studies, he showed patients with varicosities of the superficial system both with and without ulcers and all with normal femoral and popliteal veins. Another group on whom a proper vein stripping had been done without control of the ulcer also showed normal femoral and popliteal veins. Cockett also reported a group of 16 ulcer patients with no incompetent superficial veins and no history of deep vein thrombosis, of whom 11 showed normal femoral and popliteal veins, while 5 showed valveless deep veins. It was his opinion that after a deep femoral thrombosis, recanalization occurs and is complete in about two years in about 90 per cent of the patients. In about 10 per cent, recanalization does not occur. Also, destruction of the valves in the femoral and popliteal veins is not a prerequisite for ulceration or induration of the lower leg.

TREATMENT

Homan's statement in 1916 about the treatment of ulcers is still apropos today—that the cause



Fig. 7. Wide excision of the ulcer and ulcer bearing tissue.



Fig. 8. Wide excision of other leg of patient shown in figure 7.

for failures is "not so much from the lack of effective weapons in the surgeons' armamentarium as from his failure to choose the weapon according to the strength of his opponent." Moyer and Butcher¹⁰ stated that the "greater the number of recommended treatments for a disease, the greater is the likelihood that all lack real worth."

Conservative treatment. Conservative treatment is indicated for those of the older age group whose general body condition would not permit surgery or for the person whose ulcer is relatively small, early in the degenerative process, and in which the local fibrosis is minimal. It is also of value in obese individuals who are on a program of weight reduction.

This treatment may include such things initially as (1) bed rest with the affected leg elevated for two to four days, (2) cleansing the area with PHISOHEX, and (3) moist dressings.

Later, a contoura-elastoplast pressure dressing is applied. First, a layer of contoura dressing is used, with the foot in dorsiflexion, followed by a roll of elastoplast. The elastoplast begins at the

base of the toes and extends to the knee with the tension decreasing as the knee is approached. This bandage is changed every three to four days at first and later every seven to ten days until the ulcer is healed.

Exercise is advised. The patient is told to go about his work as usual and to occasionally elevate his leg.

When the ulcer is well healed, a supportive dressing is applied, consisting of an Ace Bandage over an elastic stocking, which also protects the area from external trauma. This dressing is maintained for about one year, after which either the Ace Bandage or the elastic stocking may be removed, but one or the other is necessary for several years.

The next important step is the stripping of the superficial varicosities and perforating veins if they are present. Before this procedure is carried out, a light tourniquet should be applied around the thigh, and the patient should be encouraged to walk to be sure that claudication does not develop, which would indicate that the deep veins are no longer patent.

SURGICAL EXCISION

Preoperative care consists of (1) bed rest with the legs elevated for seven to fourteen days, (2) moist pressure dressings changed daily to control infection and edema, and (3) antibiotics if required. When the local reaction has subsided as much as it is going to and the edema is improved, the leg is ready for surgery.

Surgery. The proper excision of the ulcer is wide, as is shown in figures 7 and 8, and should include not only the surrounding scarred borders but also some of the area of eczema and pigmentation. The extent of the excision is based on surgical judgment, but the trend is toward greater and greater excisions.

The excision is performed under a pneumatic tourniquet and should extend down to and, if necessary, include the deep fascia. This is especially important when the scar involves the fascia. The perforating veins should be sought out and ligated. This will automatically be done in most patients with large ulcers, but, when the area of excision is small, a linear incision should extend up the leg to locate the remaining perforators. Care should be taken to leave the periosteum over the tibia and peritenon over exposed tendons unless preparation is made to cover the exposed vital structures with a flap.

Following the release of the tourniquet, all bleeding points are ligated and any remaining avascular areas excised. The wound is dressed with a thick Furacin gauze and kerlex pressure

dressing, and the patient is returned to the operating room in one week. Experience has shown that, while the bed may have appeared viable at the primary excision, certain areas have turned white and are avascular when the patient is returned to surgery in one week. This has accounted for the areas of loss when primary grafting has been done, further complicating the treatment, and such areas were often the site of secondary breakdown.

At the second operative procedure, if the bed is avascular, further excisions are performed and the leg redressed. The patient is returned to the operating room in five to seven days, and, if a clean granulating tissue bed has formed, the grafts are applied. A thick-split graft is taken with the Padgett dermatome, which is preferable to the Brown dermatome for this purpose. The Padgett cuts a wide, thick, even graft, and usually the area of excision can be covered with a single sheet. A fluffed gauze or kerlex pressure dressing is used with the foot and ankle mobilized in a plaster splint.

The postoperative care is every bit as important as the preoperative care. This requires that the dressing be opened or removed within twenty-four to thirty-six hours, so that the graft may be inspected for hematoma or serum pockets. If these are found, a stab wound is made over the affected area and the contents aspirated by sterile suction. The bandage is then carefully replaced and the graft inspected again within one or two days, depending on the condition that was found at the time of the initial inspection. Serum pockets can form as late as seven to ten days. Bed rest should be continued for at least two weeks, following which the patient is allowed to dangle his foot for intermittent periods while the leg is kept wrapped with an Ace Bandage.

He is next put on a program of gradual ambulation with certain periods of rest and elevation. At this time, his grafts should look like those in figures 9 and 10. He must continue to wear the Ace Bandage with an elastic stocking for at least one year, after which the bandage may be removed, while the elastic stocking should probably be worn for many years, as it protects the leg and the graft from outside trauma.

VEIN STRIPPING

Because of certain untoward results, no vein stripping procedures are advised before the ulcer is healed or grafted. In view of the fact that a number of leg ulcer patients do not have widespread varicosities, a routine vein stripping procedure for every ulcer patient cannot be justified.



Fig. 9. Grafts applied to excised areas shown in figures 7 and 8.



Fig. 10. After 2 excisions, each of which was thought adequate, the graft was applied on the twenty-first day.

SYMPATHECTOMY

This procedure has been disappointing as a treatment for venostasis ulcers unless arterial insufficiency is also present, as there is an increase in blood flow in a diseased leg with no increase in its return. It also interferes with arteriolar constriction, which should occur when the patient stands, and leads to increased capillary pressure and increased edema.¹¹

SUMMARY

1. The etiology and treatment of leg ulcers has been presented.
2. The important features in the anatomy of the venous drainage of the leg are the perforating veins which enter the deep veins at the same site as the muscle veins.
3. The pathology was discussed, which showed that a longstanding ulcer is an entity in itself regardless of the way in which it began.
4. The treatment suggested is wide excision with delayed grafting.

5. A pressure supportive dressing is required for at least one year postoperatively.

6. Vein stripping is not a routine procedure for every ulcer patient.

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Accidental Poisoning in Children

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AMONG THE 10 leading causes of death in the United States as well as in Minnesota, accidents are in fourth place, being surpassed only by heart disease, cancer, and cerebrovascular lesions. In 1958, there were 91,000 accidental deaths in the United States. It is estimated that there were more than 9 million injuries in which victims were disabled for more than one day. The cost was over \$12 billion in wage losses, medical and hospital bills, property damage, and insurance costs.

Staggering as is this estimate of 9 million injuries, it is not the whole story. For the past two years, the United States Public Health Service has been carrying on a National Health Survey to obtain current data on illness, injuries, and disabilities in this country. This survey is being carried out by means of a random sampling technique of household interviews in various parts of the United States. A recently published report of interviews covering 36,000 households carried out between July 1, 1957, and June 30, 1958, indicates that 47 million injuries occurred in this twelve-month period, which resulted in the restriction of usual activities for at least one day or the necessity for medical care. This includes 17 million children who sustained injuries. Forty per cent of all injuries were the result of home accidents. Accidents have become one of our serious public health problems.

To bring the problem closer to home, there were 1,675 fatal accidents in Minnesota in 1958. Motor vehicle accidents were responsible for about 40 per cent and home accidents for almost one-third of the deaths. There was, thus, a difference of only 7 or 8 per cent between the number of fatalities caused by automobile accidents and those in the home. And yet, the most intensive efforts are directed against the prevention of motor vehicle accidents. This is rightly so, but comparatively little attention is given to home accident prevention, perhaps because traffic accidents are more spectacular. The often repeated statement that "home is the safest place in the

world" carries little truth when we realize that home accidents cause a death every nineteen minutes and an injury every eight seconds. In Minnesota last year, 1 of every 52 deaths was the result of a home accident. This, then, is a very serious problem.

Poisoning ranks third as a cause of accidental death in the home. Every day in the United States, 3 persons die, and it is estimated that 425 persons are treated daily in the emergency rooms of hospitals for chemical poisoning. Eighty per cent of fatal poisonings occur in the home, and children under the age of 5 years constitute the largest group. However, mortality is only a small part of the problem. For every death from poisoning, several hundred, and the most recent estimate is 700 to 800, nonfatal poisonings occur. Accidental poisoning is childhood's most common nonsurgical emergency.

According to the Committee on Toxicology of the American Medical Association, more than 250,000 trade-name chemical products are available for industrial, farm, or home use, and new compounds are constantly being developed at the rate of about 1,000 per month. Their potential toxicity poses a serious problem in public health. Valuable and harmless as these products are when properly used, each one is a hazard if improperly used. The labels of many such products carry no information in regard to their identity, content, possible toxicity, directions for safe use, or emergency treatment.

Potential poisons are found in every room of the home, in the garage, and in the yard or the barn on the farm. For example, in the bedroom are found mothballs, nail polish remover, permanent wave solution, depilatories, and hair dye. In the living room, there may be lead painted surfaces or cigarette lighter fluid. In the bathroom may be found a variety of medicines, including aspirin, candy laxatives, barbiturates, disinfectants, and liniment. The kitchen may store ammonia, lye, detergents, bleaches, furniture and metal polishes, and insecticides. The basement probably contains cleaning fluids, laundry ink, fabric dyes, rat poison, turpentine, paint, kerosene, and bleaches. In the garage, there may be antifreeze solution, denatured alcohol, gaso-

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line, naphtha, benzene, automobile polish, and garden sprays. On the farm, in the barn or in the yard, there may be the organic pesticides. The older rat poisons containing strychnine or phosphorus and the insecticides containing arsenic or nicotine are deadly to man. These are a rather formidable array of potential hazards to which children are daily exposed.

As a result of various epidemiologic studies of accidental poisonings, data are available as to age groups, sex, location, time of day, type of toxic substances, and various contributory factors. A consideration of these data should suggest possible approaches for reducing the annual toll of preventable accidental poisonings.

The first formal poison control program was inaugurated in Chicago in 1953. Of the first 500 patients treated, 467 were under the age of 5 and most of them were between the ages of 1 and 3 years. A most extensive analysis made by the New York City Poison Control Center in 1956 showed that 54 per cent of the poisonings occurred in those under the age of 19 years. Of these, three-fourths were under 4 years of age, and two-thirds were under the age of 3 years. Several hundred different substances were responsible for the poisonings, the most common being salicylates, sedatives, bleaches, lye, petroleum products, turpentine, and pesticides. Five substances accounted for poisonings in one-third of those under the age of 19 years. These were aspirin, bleach, lead, barbiturates, and lye, respectively.

A more detailed consideration of the two most frequent causes of poisoning is of interest. Aspirin is the most frequent cause and is responsible for more than one-fifth of all poisonings. It occurs most often in children under the age of 5; the average age is $2\frac{1}{2}$ years. To understand childhood poisoning, it is necessary to recognize the normal growth and development of children. The age of about $2\frac{1}{2}$ is the exploration period when children are extremely mobile and pick up everything. It is said that children under 4 are like human pelicans—everything goes into their mouths. And remember, children don't taste; they swallow—before they can be stopped. Another characteristic is their intense curiosity. But, at this stage, curiosity rules without benefit of previous experience. They are also great imitators. They love to mimic their parents, and parents set quite an example by the number and variety of pills, tablets, and liquids they swallow.

The frequency of aspirin poisoning is not so surprising when we find that the American public spends \$135 million per year for aspirin and

other analgesics. It is reported that 5,500 tons of aspirin are manufactured annually in this country. This amounts to about 20 billion, 5-gr. tablets, or approximately 100 tablets for every man, woman, and child in this country. Since children are extremely active and are good climbers, the frequency of aspirin poisoning is in direct proportion to its availability and accessibility.

Household agents are the second most frequent cause of poisoning, with bleaching agents being the chief offenders. Such poisonings occur most often in youngsters under the age of 2 years. This is the creeper or toddler stage when children crawl on the floor and cannot reach high places. Thus, they are more likely to be poisoned by substances stored on the floor, in low cupboards, or under the sink. The common household agents are found in these places.

Studies show that more boys than girls are poisoned. This is true for all types of accidents. Most poisonings occur between noon and 6 P.M.; the next most frequent period is between 6 A.M. and noon. The kitchen is the most dangerous room in the house, the bedroom is second, and the bathroom is third.

Certain contributory factors are of importance in poisoning. In over half of the poisonings due to bleach, solvents, ammonia, kerosene, furniture polish, and insecticides, the substances were not in their original containers. Toxic substances stored in cups, saucers, drinking glasses, pop bottles, mayonnaise jars, jelly glasses, coffee cans, milk bottles, fruit jars, and pitchers are dangerous because children know that utensils are intended for drinking and eating, and they cannot distinguish between food and toxic agents. These substances are also frequently found within reach of children in open places, such as on dressers, tables, shelves, floors, open drawers, under the sink, or on window sills.

Toxic substances are frequently carried in handbags and purses with which children play. Accidents occur frequently in the home of grandparents. They occur more often when there is no close adult supervision. Close supervision means more than having a parent or other adult present in the house; it requires being present in the same room and closely watching the child.

PREVENTION

What can we do about the problem of accidental poisoning? There are 3 general approaches: (1) prevention through education, (2) up-to-date federal and state laws on proper labeling of toxic products, and (3) poison information and control centers. The first requirement, then, is an

educational program directed toward parents and children to point out the potential dangers and how to avoid them. For example, medicines should be kept in their original containers. Labels should be legible. Medicines should be locked up and placed out of the reach of children. Old prescriptions should be discarded. Labels should be carefully read before medicine is taken. Medicines should not be taken in the dark. Drugs and chemicals should not be stored among groceries, on accessible shelves, in dresser drawers, or in pockets or purses where children can reach them. A recent safety measure is the development of new bottle caps that cannot be easily removed. Such effective safety closures for all packaged and prescribed medications should reduce poisonings in young children.

Physicians can offer accident prevention education as a part of their services. They can distribute child safety pamphlets to mothers and point out potential hazards and suggest corrective measures on home visits. Public health nurses are familiar with the growth and development of children and can recognize physical and emotional disturbances in older persons. They can advise necessary precautionary measures. Sanitary inspectors can recognize environmental hazards and can advise on the proper storage of toxic agents. Pharmacists can assist by dispensing properly packaged and labeled drugs and chemicals and by warning customers of the potential toxicity of the products purchased.

Second, stronger and up-to-date federal and state laws on the safe labeling and packaging of household chemicals are necessary. Three federal laws are in effect, the latest one dated 1947. These laws are old and have not kept pace with technologic progress. Thus, a large number of toxic products are outside the protective framework of these laws. The American Medical Association has recently prepared a Uniform Hazardous Substances Act for use by state legislatures.

Third, and the most recent approach, is the establishment of poison information and control centers. The first center was established in Chicago in 1953. There are now more than 250 centers in some 42 states. In cooperation with the Academy of Pediatrics, the State Medical Association, the Department of Pharmacology of the University of Minnesota, other professional groups, and the PTA and with the financial support of the Minnesota State Pharmaceutical Association, a poison information center has been established in the Minnesota Department of Health.

In addition to the central center in the State and to save lives.

Health Department, there will be some 20 or more regional or subcenters at key points throughout the state, including the 11 regional hospitals outside of the Twin Cities. There are now 15 regional centers established and operating. There are 5 in Minneapolis: Abbott, Fairview, General, North Memorial, and Northwestern hospitals. There are 6 in St. Paul: Ancker, Bethesda, Children's, St. John's, St. Joseph's, and St. Luke's hospitals. The others are in Duluth, Fergus Falls, Mankato, and Worthington. Regional or subcenters are provided with a basic reference file of information for the identification of most substances and trade-name products that are toxic to children. The file of information is kept current and is expanded as necessary from the central center in the Minnesota Department of Health. Six other regional hospitals will be established as soon as funds are available.

As regional centers become established, the information will be directly available to physicians from their local regional poison information officer. If the necessary information is not available, it will be provided from the main center where special technical data will be provided. Treatment will be available through the emergency rooms of these hospital centers. Telephone inquiries from parents are answered by giving information on toxicity and first-aid instruction. They are advised to call their family physician. If he cannot be reached, they are advised to bring the child to their nearest hospital center for prompt treatment.

The Minnesota program operates primarily as an information center. It provides information on the identification of ingredients in agricultural, household, industrial, and commercial products and on known facts or estimates of toxicity, mode of action, site of effect, as well as recommended therapies. Such information will make it possible for physicians to reach a prompt and intelligent decision concerning the need for emergency treatment, hospitalization, laboratory tests, and prophylactic treatment.

SUMMARY

Chemical poisoning of children is preventable if ordinary safety precautions are employed in the handling, use, and, particularly, the storage of drugs and toxic household chemicals. Toxic substances must be properly labeled. Education is most important in prevention. When these measures fail, however, poison information and control centers can provide the information and treatment necessary to minimize bodily damage

Diagnosis and Treatment of Rheumatic Fever

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EACH OF US, I am sure, has at some time been faced with the almost impossible task of deciding whether or not a particular patient with equivocal signs had rheumatic fever. If this were an academic question, we could merely sit back and wait for nature to take its course. Unfortunately, the consequences of such a conservative attitude might well be disastrous. On the other hand, for fear of missing a case, we might be tempted to overdiagnose. The consequences of this latter approach will lead to much unnecessary worry, expense, and needless invalidism to say nothing of the future difficulties in buying insurance. If the readers expect this paper to help them off the horns of this dilemma, they will be disappointed. All that I am striving to do is to help clarify our thinking on this problem, to present some of the current ideas about this disease, and to add a few observations of my own.

The full-blown case of rheumatic fever is not difficult to diagnose. The typical case, unfortunately, is not typical of this disease. There are no pathognomonic signs of rheumatic fever and no sharp boundaries. The diagnosis is made when the evidence is considered sufficiently strong. Why this is so can be explained in part by considering the pathology of the disease. The basic lesion early in rheumatic fever is considered to be a nonspecific exudative proliferation.¹ This proliferation can occur anywhere in the body but does have a predilection for certain organs and tissues. The clinical picture, therefore, varies greatly, depending upon the organs and tissues principally involved and the extent of involvement. To make the diagnosis more difficult, we find that frequently this disease is not completely manifest for quite some time. As we

watch the patient, he seems to acquire other signs and symptoms which finally make the diagnosis more obvious. That is why the consultant often has an advantage. He usually sees the patient later in the course of the disease.

In 1944, T. Duckett Jones suggested certain criteria which he considered useful in the diagnosis of rheumatic fever. These criteria as modified by a committee of the American Heart Association² have become so generally accepted that I will use them as an outline in discussing the diagnosis of rheumatic fever:

Major criteria

1. Carditis
2. Polyarthritides
3. Chorea
4. Subcutaneous nodules
5. Erythema marginatum

Minor criteria

1. Fever
2. Arthralgia
3. Prolonged P-R interval in the electrocardiogram
4. Increased sedimentation rate, presence of C-reactive protein, or leukocytosis
5. Evidence of preceding Beta hemolytic streptococcal infection
6. Previous history of rheumatic fever or the presence of inactive rheumatic heart disease

According to Jones, rheumatic fever can be diagnosed with reasonable certainty if any two major or one major and two minor criteria are present. Jones never meant these criteria to be rigid. I am sure many bona fide cases of rheumatic fever never fulfilled these criteria. This is attested to by the many patients with obvious rheumatic heart disease whose history failed to satisfy these criteria.

MAJOR CRITERIA

Carditis. This can be endocardial, myocardial, pericardial, or any combination of the three. If the presence of a carditis is unequivocal in a child who is known to have been previously normal, this factor alone can be sufficient to establish the diagnosis, but the case is rare in

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which it can be definitely said that no murmur was present previously. Very few of us record on our charts the absence of a murmur or the presence of that which sounds like an innocent murmur. I believe this observation is very important and should be put in writing at birth and periodically during the time the child is under observation. The murmur heard in early rheumatic fever is usually a mild grade 1 to 2 blowing apical systolic murmur which is loudest near the apex. At times, it is very difficult to distinguish it from an innocent murmur. Fogel³ describes five types of innocent murmurs. The most common is that which he calls the twanging string or groaning murmur. This is most frequent in the 3- to 7-year age group. It is heard loudest at the third or fourth interspace at the left sternal border and is usually grade 2 in intensity. This is a very characteristic murmur and easily detected. The second most common murmur is located over the base of the heart or pulmonary area and is actually heard loudest in the supraclavicular area. It is a short, blowing systolic murmur usually grade 2 in intensity and diminishes or disappears entirely with local neck pressure or changes of position. The remaining three innocent murmurs are less common and are called the cardiorespiratory murmur, which varies in intensity with respiration and is infrequently found in children; the hemic murmur; and, last, the venous hum. The murmur of rheumatic fever is longer, filling most of systole, and is transmitted to the axilla and precordium and does not vary with change of position. At times, the murmur is louder and harsher, and there may, in addition, be a diastolic murmur. The exact cause of a diastolic murmur is not clear, but, when it does occur, it is considered significant. These murmurs can be transitory, disappearing as the acute stage subsides, or permanent. In spite of this elaborate description, there are many cases in which it is difficult to tell an early rheumatic fever murmur from an innocent one.

A mild degree of cardiomegaly may be noted on the roentgenogram, which is largely due to an enlarged left atrium. In the more severe case, the cardiomegaly can be extreme and the child may even go into acute heart failure, which is almost exclusively right sided. A friction rub indicating pericarditis is a frequent accompanying sign. Pneumonitis is often encountered in severe cases of rheumatic carditis. When it does occur, it indicates a very poor prognosis. This is not a bacterial pneumonia and can be distinguished on microscopic examination. The appearance of this pneumonia on the roentgenogram is quite variable.

Polyarthritis. This usually involves only the larger joints and can involve several simultaneously or in succession. Characteristically, heat, redness, swelling, severe pain, and tenderness are present. Since rheumatic fever occurs in an age group in which multiple varied and vague complaints of pain in the extremities are common, it is sometimes not easy to distinguish between them. It is said that the patient with rheumatic polyarthritis does not wish to have his extremities massaged or rubbed, while the patient with limb pains not due to rheumatic fever does. I firmly believe that if the diagnosis of rheumatic fever is restricted to those having the typical picture of polyarthritis previously described, a large number of cases will be missed. I have seen many patients with definite rheumatic heart disease in whom the clinical picture of polyarthritis could never be clearly elicited. Many of them do recall having vague, transitory, mild pains in their extremities. I recall following two patients with mild pains in their extremities in whom characteristic rheumatic fever with typical carditis and subcutaneous nodules ultimately developed. On the other hand, in our eagerness not to overlook a case of rheumatic fever, we should not forget that there is a definite entity, which, for lack of a better term, can be called "growing pains."

Chorea. The onset of chorea in most children is usually slow and very insidious. The first signs are usually noted in school when the teacher reports that the child is difficult to manage. He cannot concentrate, will not sit still, is irritable, moody, and often fights with his schoolmates. At home, he is unable to get along with his brothers, sisters, and parents. Other children and teachers as well react unfavorably to these children and their changed attitude, which only compounds the difficulties. The situation becomes gradually worse, and the child finally shows irregular or coarse, jerky movements and is unable to feed himself or drink a glass of water without spilling it. He shows facial grimacing, and his handwriting becomes illegible. When sticking his tongue out, there is a coarse tremor. This condition is usually bilateral, but it may rarely be limited to one side when it is called hemichorea. Children with chorea seldom show other evidence of the acute disease, such as polyarthritis, elevated white count, fever, and abnormal acute phase proteins. I am quite sure that there are many cases of chorea which are due to nonrheumatic causes. It is also most important that chorea be distinguished from habit spasms and athetosis, as well as cerebellar ataxia.

Subcutaneous nodules are small, freely movable nodules found immediately under the skin. Usually, they occur symmetrically and are loosely attached to joint capsules, tendon sheaths, or periosteum. One of the most common sites is over the distal part of the humerus, but they are also found on the scalp, over the vertebrae, and over the dorsum of the feet and knees. This condition usually occurs only in the severest form of rheumatic fever with carditis.

Erythema marginatum. This is a very characteristic type of lesion consisting of a faint, circular, macular, and erythematous eruption occurring primarily on the trunk, sometimes on the extremities, but never on the face. There is no associated itching or discomfort. It is often evanescent, appearing and disappearing alternately in scattered areas. These lesions have been known to persist for months and even years after the acute attack has subsided.

MINOR CRITERIA

I shall elaborate on only a few of the minor criteria.

Fever is of moderate degree, usually 101 to 103° F. and rarely, if ever, spiking.

Arthralgia refers to pains which are purely subjective but located in the joints, not the muscles.

Prolonged P-R interval in the electrocardiogram is considered a minor criterion because, though it is a common accompaniment of rheumatic carditis, it is in reality nonspecific and does occur in other illnesses. When it does occur, it is considered an excellent indicator of carditis of any origin. Unfortunately, the characteristic electrocardiogram changes are frequently transitory and can be missed unless daily electrocardiograms are made. A prolonged P-R interval is just one of the electrocardiographic manifestations of rheumatic carditis. A prolonged P-R interval is called first degree heart block, but a second degree heart block known as the Wenckebach phenomenon also occurs at times. Some prolongation of the Q-T interval may also be seen, which can be of some significance. One of the limitations of the electrocardiogram in rheumatic carditis is that it does not necessarily show whether the carditis is currently present. It may indicate previous carditis or really no carditis at all but merely a manifestation of a congenital first or second degree heart block.

Evidence of preceding Beta hemolytic streptococcal infection, as is found in verified scarlet fever, pharyngitis with an exudate from which a Beta hemolytic strep was grown, or by elevation of the antistreptolysin titer, may be seen.

A *previous history of rheumatic fever* should be well documented.

There are other manifestations of rheumatic fever, which, though they cannot be used as major or minor criteria, do strengthen the diagnosis somewhat. These other manifestations are as follows: loss of weight, easy fatigability, tachycardia out of proportion to the fever, malaise, sweating, anemia, epistaxis, erythema nodosum, precordial pain, abdominal pain, headache, vomiting, and familial history of rheumatic fever.

Someday, perhaps, someone will devise a more specific test, such as the rheumatoid factor, in diagnosing rheumatoid arthritis. Until then, we must continue to employ these woefully inadequate criteria. Cassels⁴ put it very aptly when he said, "Regardless of the method of approach to diagnosis, the fact remains that the patient either has rheumatic fever or does not have it, and at a specific time frequently it is impossible to decide."

TREATMENT

Salicylates. These agents have been the time honored treatment for many years and are still considered the treatment of choice by many. The big question is whether the salicylates constitute merely symptomatic treatment or really have some therapeutic value. After many years of thought and study, we still do not have an answer. The generally accepted dosage of salicylates is 1 gr. (0.06 gm.) per pound of body weight per day in 4 to 6 divided doses. The total dose should not exceed 150 gr. (10 gm.) per day. This full dosage should be given for at least two weeks and gradually tapered off over the next four to six weeks. Some people recommend the simultaneous administration of vitamins C and K to prevent the hemorrhage which sometimes accompanies salicylate therapy. If salicylates are chosen for treatment, it is important to give adequate doses for a long enough time, and, if salicylate intoxication appears, the dose should definitely be reduced.

Steroids. The battle over the use of steroids in acute rheumatic fever still rages. Both sides have many eminent and excellent investigators with impressive data, and the literature abounds with claims and counterclaims. In 1955, a combined study group organized in the United States, Canada, and Great Britain⁵ reported on 500 cases. One-third of these were treated with aspirin, one-third with ACTH, and one-third with cortisone. No significant differences were found. This report was criticized by some who

maintained that the dose of steroids used was too small and could not possibly have been expected to help.⁶ Others, such as Done and Kelly,⁷ maintain that the dose and length of treatment must be individualized and tailored to each patient and that steroids, if given, should be administered early in the disease to be most beneficial. One point that most workers agree upon is that patients with severe carditis and congestive failure should be treated with steroids. In such cases, they can be lifesaving and should not be withheld.

In early rheumatic valvulitis, there is an exudative proliferation at the valve margins. The steroids do have an anti-inflammatory action, so that it is conceivable that the early use of steroids will prevent the formation of this exudate with the subsequent scarring and shortening. In fact, some believe that the mode of action of the salicylates is through their steroid-like activity. The blood aldosterone level has been found to be elevated during the use of either salicylates or steroids.

Whenever any drug is used for any illness, the danger of the disease must always be weighed against the danger of the drug. This is a basic dictum in medicine and is done quite automatically, almost unconsciously. However, in many of the newer drugs, the full danger of the drug is not always found on the package. It takes years of use by many men for many conditions under various circumstances before all of the dangers and disadvantages are discovered. This is happening with the steroids. Cushing's syndrome, salt retention, diabetogenic activity, and hypertension may develop from the use of steroids, and these dangers were learned early. More recently, we have seen patients dying of bleeding or perforated ulcers. A number of cases of osteoporosis with compression fractures have been reported.⁸ Two recent long-term studies have shown that prolonged use of steroids actually interferes with growth.^{9,10} These are not drugs that can be used indiscriminately. My own policy is to use steroids, and I prefer prednisolone in all cases of active carditis or in those who do not seem to respond to salicylates. I use 75 mg. per meter square per day in 4 divided doses. After about two to four weeks, if the patient is responding, I gradually taper off over a period of several weeks.

Digitalis. Any patient in failure should receive a digitalis preparation. When Cushing's syndrome develops from the use of steroids, some patients might resemble those in mild failure. These patients will not be helped by steroids, and, in such cases, their use should be avoided.

For some reason which is not entirely clear, some patients with severe rheumatic carditis are extremely sensitive to all the glycosides and that which is ordinarily an adequate dose for patients in failure may prove to be a heavy overdose for the former. Therefore, it is important to follow these patients with frequent electrocardiograms and to decrease the dose to tolerance. I usually start with parenteral digitoxin. These patients are often so sick that the oral absorption cannot be considered optimum. The customary digitalizing dose for children under 2 years of age is 0.05 mg. per kilogram per day. For those over 2 years of age, it is 0.035 mg. per kilogram per day. One-half of this should be given as an initial dose, one-fourth six hours later, and one-fourth twelve hours after that. The maintenance dose can be started the following day and is one-tenth of the digitalizing dose. The oral and parenteral doses of digitoxin are exactly the same. Nadas¹ prefers the use of digoxin (Lanoxin). When rapid digitalization is required, this is the drug of choice. The dose of digoxin is 0.05 mg. per pound per day in patients under 2 years of age and 0.02 to 0.03 mg. per pound per day for those over 2 years of age. The maintenance dose is one-third of the digitalizing dose. This is very important to remember because there have been several cases in which a patient was underdigitalized because it was thought that the maintenance dose was one-tenth of the digitalizing dose.

Penicillin. All patients should have a nose and throat culture. If a Beta hemolytic streptococcus is found, these patients should be treated vigorously with penicillin. The type and route of penicillin is not too important, but the dose should be adequate and used for a sufficient length of time. I prefer to use aqueous penicillin in doses of 300,000 to 600,000 units every six hours for three to four days and then change to a procaine penicillin at a dose of 600,000 units per day intramuscularly for seven days. In those without active streptococcal infection, I use prophylactic penicillin in a dose of 200,000 units of an oral penicillin twice a day. In penicillin sensitive individuals, almost any of the other antibiotics will probably suffice. Sulfa drugs are the most inexpensive and equally effective, but caution must be exercised in using these drugs to treat a streptococcal infection as they will not prevent the occurrence of complicating rheumatic fever.

Bed rest. During the active phase of the disease, bed rest should be absolute. Unfortunately, there are no good reliable criteria for determining when to start ambulation. As an absolute

minimum, bed rest should continue until the patient is afebrile, pulse is normal, and digitalis is no longer required to control failure. The electrocardiogram should be normal and all other signs of acute carditis should have disappeared. The pain and tenderness of the joints should have disappeared and a feeling of well-being should be restored. It is probably not necessary for all of the acute phase protein reactions to be normal before permitting the patient to move about. If these are returning to normal and this trend continues for two or more

weeks, I start gradual ambulation and continue to check the sedimentation rate until it is normal under full ambulation. This may take many months and is quite variable from patient to patient.

Finally, these patients should be followed at regular intervals for many years. They need someone to continually remind them of the importance of taking their medication every day even though they are feeling well. They need an emotional crutch, and the family doctor is elected to serve this purpose.

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WITH PROPER CARE, a bedside prothrombin time determination using capillary blood in a capillary tube is as accurate as macromethods. The test is useful for newborn infants and for adults from whom adequate venous blood cannot be obtained. The test is not intended to supplant usual technics when venipuncture is feasible.

A capillary tube 1 mm. in internal diameter and 3 cm. long is marked off at 1-cm. intervals. A room-temperature mixture of 0.0125 M calcium chloride and thromboplastin solution (Solu-Plastin) is drawn to the 2-cm. mark. Free-flowing blood from a deep skin puncture of digital tuft, ear lobe, or heel is drawn to the 3 cm. mark. Any squeezing or local trauma used to speed the flow of blood alters the prothrombin time. If flow is too slow, a new site must be selected. The tube is held between thumb and forefinger to close the system and inverted repeatedly until a precipitate appears. Mean time from initial inversion to precipitation is about eighteen seconds, practically the same prothrombin time as obtained by the Link-Shapiro modification of the Quick test.

The capillary method requires small amounts of blood; thus, repeated tests do not deplete newborn infants.

MILTON SHOSHKES, M.D., and ELSIE GRUNWALD, B. S., Beth Israel Hospital, Newark, New Jersey. *J. Lab. & Clin. Med.* 53:617-620, 1959.

Surgery of Acquired Valvular Heart Disease in the Private Hospital

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IN THE LATE 1940's, Bailey,¹ Harken,² and others popularized mitral valve surgery. Since that time, surgeons have become increasingly bolder in their attack upon acquired heart disease. In 1954, Lillehei and his group³ opened yet another door to the problem of acquired heart disease by perfecting the heart and lung pump for human use. Today, therefore, the surgeon who wrestles with acquired valvular heart disease can use the more simply performed closed-heart technics, or, if he is surrounded by an adequate supporting team and equipment, he might avail himself of the open-heart technics.

Mitral disease is by far the leading valvular disease of the heart. The purpose of this paper is not to discuss diagnostics other than to mention the most salient points as they apply to the wisdom of surgical intervention. Should a patient be advised to undergo mitral commissurotomy? This question must be answered concurrently by the cardiologist and surgeon working as a unit. For the cardiologist to establish himself as the protector of the heart patient and to depict the surgeon as the decimator is extremely unhealthy. On the other hand, the surgeon is equally foolish to envision himself as the progressive part of the team and his counterpart, the cardiologist, as the regressor. The ultimate timing of the mitral valve surgery differs from one center to another; but, in any event, it must be a joint decision of surgeon and internist.

Over all, it is safe to state that an operation is not performed on the mitral valve because there is a murmur of mitral stenosis, a condition typical of class I patients who are without distress of any kind. The class I patient, however, should be carefully followed, evaluated, and instructed by the cardiologist. This patient requires no therapy and needs not be limited in activity, but he must return at regular intervals for examinations so that the stigmata of class II disease can be detected early in the course

of the disease. If class II signs become apparent—cardiopulmonary distress on mild to moderate exertion—and all signs and symptoms point to mitral stenosis, the patient should have a commissurotomy performed from the left side. For the class III patient who suffers cardiopulmonary distress on minimal exertion, commissurotomy is unquestionably indicated. For class IV patients who experience distress at rest, the feasibility of surgery depends upon the calculated surgical risk as evaluated against the expected improvement to the patient by an adequately performed valvulotomy.

The pressing question is this: Can the examiner determine whether a particular case represents pure mitral stenosis, a condition predominantly that of mitral stenosis, or a preponderant element of mitral insufficiency? The case of nearly pure mitral stenosis or nearly pure mitral insufficiency does not puzzle the cardiologist and surgeon; it is the mixture type of lesion that presents the difficult diagnostic and therapeutic problem. In such cases, every technical device available must be used to determine the exact nature of the mitral lesion. If left atrial and left ventricular catheterization is carried out, one can determine whether a significant obstruction is present at the mitral valve during left ventricle diastole (10 mm. Hg or above). Significant insufficiency of the valve will be manifest by the characteristic contour of the pressure wave in the left atrium during left ventricular systole. More recently, Amplatz and associates⁴ succeeded in passing a soft catheter retrograde across the aortic valve into the left ventricle so that ventriculograms and atriograms may be produced. With these refinements, the cardiologist and surgeon can, in most cases, decide whether the traditional closed valvotomy is indicated.

If all evidence indicates that the predominant lesion at the mitral valve is of an obstructive nature, a commissurotomy should be carried out as soon as the patient is in optimal condition. At operation, the surgeon can carefully evaluate the

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degree of regurgitation before and after the valvotomy is performed. It should be pointed out that the so-called pure mitral stenosis does not exist in the beating heart except on rare occasions. It is logical that a severely stenosed valve will, of necessity, be somewhat incompetent to resist the entire thrust of the left ventricle.

In essence, therefore, if the patient suffers with mitral stenosis of a predominant nature, commissurotomy from the left side is indicated unless he is completely symptomless, such as a class I patient, or is totally unsalvageable.

Bailey and Hirose⁵ recently stated that they are opposed to the left-sided approach. They contend that the right thoracotomy approach provides more accurate and direct access to the commissures, papillary muscles, and chordae tendineae. The right-sided approach is considerably more difficult, however.

Ten to 25 per cent of mitral valves which have been opened surgically restenose or refuse. These patients present a severe challenge to the cardiac team as the cardiopulmonary pathology progresses, since they are discouraged by the prospect of yet another heart procedure, the radiologic interpretation may be more difficult due to previous surgical distortion, and, finally, the operation itself is more difficult due to adhesions. If the diagnosis is doubted sufficiently, a combined left heart catheterization will help to determine the correct course of action.

The second mitral commissurotomy should be carried out through the right thorax as described by Bailey and Morse.⁶ The right-sided approach is preferable in the recurrent cases for the following reasons:

1. The posteromedial commissure which may have refused or may not have been adequately opened at the first surgery is the more accessible commissure by this approach and can be dealt with quickly and accurately either by finger fracture or by a knife.

2. The chordae tendineae and papillary muscles are in a more direct line with the index finger and are, therefore, more easily freed one from the other.

3. The tricuspid valve is easily explored.

4. Though the anterolateral commissure is farther away from the operator, it can be reached if the left atrial wall is invaginated slightly by the operator's hand.

5. After the left atrium has been separated from the right atrium and exposed adequately, very little difficulty is encountered in placing the necessary holding suture, or sutures, in the left atrial wall.

The right-sided approach is troublesome for the following reasons:

1. For the uninitiated, the absence of the atrial appendage presents real and mental hazards. This objection does not obtain for the second mitral surgery, however.

2. Preliminary dissection is necessary to separate the right and left atrium sufficiently to place the holding suture. Undue rushing at this stage or an accidental rent in the left atrial wall before all is in readiness presents a critical hemorrhage problem that cannot always be controlled.

3. If ventricular fibrillation develops, it is most difficult to place the defibrillator electrodes across the two ventricles. The advantages of the right-sided approach, however, far surpass the disadvantages for the recurrent mitral stenoses.

The postoperative care of the mitral surgery patient presents a variety of problems, but 3 factors have proved to be of utmost importance. First, every attempt must be made to maintain a completely clear tracheobronchial tree. A heavily humidified oxygen tent (90 to 95 per cent humidity, 10 to 14 liters per minute, and oxygen flow at 70° F.) is the ideal postoperative environment. The high humidity prevents desiccation of the otherwise thick, tenacious, tracheobronchial secretions. Someone with the enthusiasm of a high school cheer leader must force the patient to cough. He must be thoroughly warned preoperatively that he will be forced to cough. The surgeon must resist the temptation to make the patient completely comfortable with drugs which will depress his ability to cough and cooperate. Second, one must pay assiduous attention to the electrolytes but, at the same time, resist the desire to tamper prematurely. Undoubtedly, there are occasions for the use of hypertonic salt solution for severely low serum sodium;⁷ but these occasions are sparse indeed. It is far preferable to allow the patient oral intake as soon as ten to twelve hours after surgery, limiting the intake to approximately 20 to 25 cc. per kilogram of body weight per twenty-four hours. The patient can be allowed any clear liquid he desires with the possible exception of bouillon which contains too much salt (2.5 gm. per cube) for the immediate postoperative period. Within three days, the patient should be graduated to a regular light diet without the privilege of extra salt on the tray. Finally, the patient's weight should be checked at least once and preferably two times daily. This simple test can detect water loading as readily as any other procedure. Antibiotics and digitalis preparations

are used universally. The continued use of oral antibiotics for as long as one or two years post-operatively seems wise.

Mitral insufficiency. The insufficient mitral valve presents a more formidable problem. Davila and associates⁸ have described an atrioventricular annular constricting procedure which has not proved successful in the hands of others. Other technics have been described, such as the Lucite ball valve⁹ and the pericardial graft.¹⁰ To date, none of these seems to be adequate. The advent of open-heart surgery by Lillehei and his group¹¹ has made possible a direct attack on the valve. By direct visualization of the leaflets, one can reconstruct the valve if possible, separate fused commissures, and accurately adjust the chordae tendineae and papillary muscles. Lillehei has stated that the open-heart type of approach is more satisfactory for the severely stenosed mitral valve, the recurrently stenosed mitral valve, and the insufficient mitral valve.¹¹ Direct vision of the valve has reaffirmed what others have already written—that the aortic leaflet of the mitral valve can invariably be reshaped and reestablished as a functioning valve part, whereas the mural leaflet may need total replacement. The Minnesota group has already successfully replaced the mural leaflet with a roll of Ivalon or silastic rubber.¹¹ The prosthetic valve is far from an accomplished fact at this point, but it is encouraging to know that when the perfect valve is developed it can readily be placed within the heart.

The aortic valve. Since the aortic valve straddles two high pressure systems, the left ventricle and the aorta, it is more treacherous to deal with than the mitral valve. Also, the underlying pathophysiology of aortic disease is considerably more lethal than that of mitral disease. Left heart failure resulting from aortic disease indicates that the musculature of the left ventricle has literally ceased to function effectively as the thrusting force for the blood. Thus, the heart surgeon may repair the valve adequately only to find that the left ventricular muscle will no longer function as a pump. On the other hand, heart failure resulting from mitral disease may mean that the mitral valve is simply obstructing flow. If this obstruction is removed by commissurotomy, the left ventricle will function once more as the primary pump for the body. For this reason alone, not to mention the proximity of the coronary arteries, the danger of air embolism, and the inaccessible position of the valve itself, aortic surgery is beset with difficulty.

Nevertheless, successful attacks on the valve have been made. Glover and Gadboys¹² reported

a highly successful series using the transventricular approach. Harken and associates¹³ reported equal success with the transaortic method. Lewis and co-workers¹⁴ have used hypothermia and direct visualization of the valve with notable success. Success with the extracorporeal circulation technics is being reported frequently of late. Garamella and associates¹⁵ described an ingenious method of removing the noncoronary cusp for aortic insufficiency. As yet, an acceptable valve for subcoronary artery placement has not been perfected.

Regardless of the type of corrective or palliative surgery that the surgeon is able to offer the patient with aortic valve disease, the left ventricle must have residual driving force. If the left ventricle has failed completely, none of the ingenious methods yet devised will save the patient's life. Therefore, surgical correction before irretrievable failure has sealed the patient's fate remains the crying need in aortic disease. The cardiologist must be prepared to recommend surgery with its 6 to 10 per cent hazard on the basis of the aortic murmur and the radiologic and catheterization findings. It is difficult for the patient to accept and for the cardiologist to recommend aortic surgery at a time when the symptoms are easily controlled by a digitalis preparation and minor restriction of activity. However, early surgical correction is the only hope for aortic disease irregardless of the type of operation performed.

There is little doubt that direct visualization of the aortic valve will be the more acceptable method of treatment after the subcoronary prosthesis is perfected. Until that time, however, there is some place for the more simply performed nonvisualization technics, particularly in the large private hospitals. The transventricular aortic valvotomy as described and refined by Glover and Gadboys¹² can be carried out quickly and readily by the trained surgeon without highly specialized equipment. Time and recurrence rates will soon answer which surgical approach is superior.

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THE INITIAL SERIES of 3 injections of ultraviolet-irradiated, formalin-treated poliomyelitis vaccine should be supplemented by at least 1 and possibly 2 injections at yearly intervals. The duration and degree of seroimmunity after vaccination was studied in 4,000 children observed for periods of from two to five years following immunization. In most instances, the first 3 injections were made at short intervals. The average immune status was increased by the first series of injections but declined during the next twelve to thirty-six months; after the first booster injection, the antibody levels reached a higher level and fell less than after primary immunization; after a second booster dose, the titers were even higher. The response to type 2 antigen was better than the responses to types 1 and 3. A commercially prepared vaccine used in the final stages of the study was at least as potent as was the experimental vaccine used at the start.

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Dietary Management in Lower Gastrointestinal Disease

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DIETETICS HAS BECOME an integral part of medicine today. Virtually every hospital has a trained dietitian and should have. Dietary therapy constitutes one of the most powerful tools in the armamentarium of the clinician. The value of dietetics applied to congestive heart failure, gout, diabetes, and many other diseases is well known. Dietary management can mean the difference between success and failure in the treatment of a patient with a particular disease process. This paper will discuss dietary therapy in some intestinal diseases. Diseases involving the intestine secondarily are purposely omitted.

PHYSIOLOGY OF THE INTESTINE

"The functions of the digestive tract comprise the mechanical comminution and transport of the food, its digestion by appropriate chemical reagents, and delivering of the end product to the circulating fluid."¹ Absorption takes place in the stomach to a limited extent but mainly in the small bowel. The average length of the small intestine is 21.5 ft.² The serosal surface measures about .6 sq. meters, whereas the mucosal surface measures about 10 sq. meters.¹ Small intestinal motility consists of rhythmic contractions and relaxations at regular intervals. These may extend over an area of less than 1 cm. to several centimeters. It has been suggested that motility is less in the distal intestine.³ Peristalsis is probably initiated by the stimulating effects of intestinal contents, distention, or specific chemical substances. Peristaltic rushes are vigorous peristaltic waves noted especially in intestinal irritation from strong cathartics. The most important large bowel contractions are the so-called mass movements which transfer large amounts of fecal material to a more distal part of the colon. These occur about once or twice in twenty-four hours, usually after meals, with an accompanying urge to defecate.

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Kremen and associates,⁴ working with dogs, showed that 50 to 70 per cent of the proximal small intestine could be removed without ill effect. However, with loss of 50 per cent of the distal portion, increased fat excretion and pronounced weight loss occurred. They also demonstrated that in controls, cereal, fiber, and soya protein were less effectively absorbed than meat protein. Other studies³ indicate that glucose, urea, and possibly water are more effectively absorbed in the proximal small intestine. This is possibly explained by decreased motility and subsequently less mucosal area in the distal intestine. Pietz² studied patients with massive small bowel resections of 6 ft., 7 in. or more and made several interesting observations. Calcium absorption was more effective in the proximal intestine because of the acid media. Calcium metabolism was satisfactory if at least 6 ft. of mesenteric small intestine were preserved. Sodium and chloride absorption were more effective in the distal intestine and colon. He noted that the colon was able to adjust and increase its capacity to absorb water, electrolytes, and amino acids but not fat. Fecal fat and nitrogen were both increased, but a positive balance could be maintained. He concluded that an equal amount of ileum was a better functioning unit than an equal amount of jejunum. Therapeutic considerations here included a low-residue diet, which will be discussed later, and a low-fat diet with supplements of sodium bicarbonate, calcium carbonate, and potassium. Also advised were the potassium salt of carboxylic acid resins and tincture of belladonna.

IDIOPATHIC STEATORRHEA (NONTROPICAL SPRUE)

Dicke in 1950 first described the beneficial effects of a gluten-free diet in children with celiac disease. The counterpart in the adult, idiopathic steatorrhea, or nontropical sprue, has likewise responded favorably in many cases. Briefly, the syndrome includes chronic or recurrent diarrhea characterized by yellowish, foul, liquid to mushy, bulky stools; abdominal distention; weight loss;

muscular wasting; anorexia; weakness; tetany; glossitis; pallor; and bone pain. Fractures (secondary to osteomalacia) may occur. An anemia is frequently present and may be due to decreased iron and/or B₁₂ and folic acid absorption. Roentgenograms reveal the typical deficiency pattern. The syndrome is more common in women and usually appears in the third to fifth decade. Adults frequently give a history of chronic diarrhea in childhood, possibly celiac disease itself.⁵ Various diets have been employed for the treatment of idiopathic steatorrhea with moderate success. Prior to the glutenfree diet, a low-fat, low-starch diet was in vogue. This diet excluded such foods as butter, cream, lard, olive oil, salad oils, and all foods fried in fats. High starch foods include potatoes, beans, corn, bread, cereals, cake, and candy. Bananas were a mainstay in the diet of the child with celiac disease. When ripe, bananas contain 19.2 per cent sugar, but, when still green, they contain much starch.

There are two principle fractions of wheat—starch and protein. The protein fraction is known as gluten. Gluten is a constituent of many grains but occurs in large amounts in wheat and rye. Some investigators^{6,7} feel that oats may cause symptoms, but Frazer⁸ does not feel that oats are important in the production of the syndrome. Van de Kamer and associates⁹ and Frazer⁸ have studied the constituents of wheat extensively. Wheat contains starch, gluten, ash, crude fiber, and fat. Gluten is further subdivided into its two protein fractions, gliadin and glutenin.⁹ The gliadin fraction appears to be the offending agent.^{9,10}

Van de Kamer and associates⁹ challenged a 7-year-old girl with celiac disease who was particularly sensitive to wheat. This patient developed severe abdominal pain and vomiting three to six hours after the ingestion of gluten. Wheat starch, ash, crude fiber, and fat produced no reaction. A mild reaction was obtained with glutenin, but both gluten and gliadin produced severe reactions.

Frazer⁸ found that either deamination or acid hydrolysis of wheat gluten rendered it harmless; however, when digested with peptic and tryptic enzymes, the water soluble peptide fraction was still harmful. When this fraction was digested with an extract of pig intestinal mucous membrane, it became harmless. These studies support the view that the offending substance is a glutamine containing peptide, not free glutamine. It has been postulated that the amount of protein-bound glutamine in any given protein is an important factor. Rice and corn are not offenders but contain gluten. The amount of pro-

tein-bound glutamine, however, is considerably less than in wheat or rye. Frazer⁸ demonstrated high blood levels of a glutamine containing peptide.

The basic defect remains obscure. An allergic phenomenon has been postulated in which the soluble breakdown products of wheat and rye gluten cause a local tissue reaction with increased secretion of mucus which delays absorption but does not interfere with digestion.⁵ An alternative explanation is a metabolic defect in which the individual is unable to digest a specific protein and the gluten acts as a "blocking agent" for an underlying metabolic disorder, possibly of the pterylglutamate fraction.^{10,11}

Several series have been reported indicating very favorable results with a gluten-free diet. French⁵ studied 22 cases. Criteria for recovery were disappearance of diarrhea and glossitis with a return of appetite and energy, gain in weight, and return of the blood picture and fecal fat excretion to normal. Nine of the 22 patients recovered on diet alone, 1 on diet supplemented with folic acid, vitamin B₁₂, and ACTH. Six patients satisfied the preceding criteria, but fecal fat was not assessed. Three patients and 2 patients, respectively, were challenged with 20 to 30 gm. of powdered dry gluten and 100 gm. of wheat flour daily. All had a recurrence of symptoms, whereas those in a control group did not. Sleisenger⁷ studied 10 cases and noted dramatic recovery in 8. One was lost to follow-up and another stopped the diet temporarily but had started it again and was doing well. Fat absorption increased from 35 to 94 per cent and 64 to 96 per cent, respectively, in 2 cases evaluated. Also noted was a positive balance of calcium, sodium, phosphorus, potassium, and nitrogen. The deficiency pattern revealed on roentgenograms persisted but was usually improved. Dilation, however, disappeared. Van de Kamer and associates⁹ challenged 2 patients with gluten and 3 with gliadin, and steatorrhea developed in all of them.

The gluten-free diet is reportedly ineffective in tropical sprue, regional enteritis, and pancreaticogenous steatorrhea. Ruffin,¹² however, reported the case of a 39-year-old woman in whom symptoms of sprue developed on a trip to South America at the age of 27. She had had up to 28 stools daily and weighed 89 lb. at the time dietary treatment was started. She experienced dramatic relief of symptoms and gained 43 lb. over a three-month period.

Why do some patients fail to respond? Mistaken diagnosis is an obvious answer for some. Failure to adhere to the diet accounts for others. As will be noted later, many unsuspecting foods

contain wheat or rye gluten. There are about 7 gm. of gluten in 100 gm. of wheat. One investigator⁶ reported that there must be at least 10 gm. of gluten in the diet of a child with celiac disease before symptoms will recur. French,⁵ however, related that symptoms may persist with as little as 1 gm. of dietary gluten daily. He also noted that normal fat absorption was achieved in as little as twenty days but that some cases required as long as two-hundred days. Periods of less than six months constitute an inadequate trial. Children characteristically respond more quickly than adults. Cook¹¹ does not feel that the failure to respond to a gluten-free diet precludes the diagnosis of idiopathic steatorrhea.

The gluten-free diet forbids the use of wheat, rye, and probably oats as well. A list of foods that must be excluded from such a diet follows.

FOODS TO BE OMITTED IN A GLUTEN-FREE DIET

Meats, fish, and poultry	Meat patties or meat, fish, or chicken loaf made with bread or bread crumbs; croquettes; breaded meats, fish, or chicken; chili con carne and other canned meat dishes; cold cuts, unless guaranteed pure meat; and bread stuffings.
Gravies, sauces	All gravies or cream sauces thickened with wheat flour.
Bread	All bread, rolls, crackers, cake, and cookies made from wheat or rye; Ry-Krisp; muffin, biscuit, waffle, and pancake flour mixes and other prepared mixes; rusks; zwieback; pretzels; any products containing oatmeal, barley, or buckwheat; breaded foods; and bread crumbs.
Cereals and cereal products	All wheat and rye cereals; wheat germ; barley; oatmeal; buckwheat; kasha; noodles; macaroni; spaghetti; and dumplings.
Fats	Commercial salad dressings, except pure mayonnaise (read labels).
Vegetables	Any prepared with cream sauce or breaded.
Soups	All canned soups except clear broth; all cream soups unless thickened with cream, cornstarch, or potato flour.
Desserts	Cakes, cookies, and pastry; commercial ice cream and ice cream cones; prepared mixes; puddings; all homemade puddings thickened with wheat flour.
Beverages	Postum, malted milk, and Ovaltine (read labels on instant coffees to see that no wheat flour has been added); beer and ale.
Sweets	Commercial candies containing cereal products (read labels).

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Some of the meat products which contain gluten are frankfurters, sausages, and bologna. Spaghetti, macaroni, catsup, mustard, salad dressing, mayonnaise, chocolates, malted milk, chewing gum, and ice cream likewise may contain gluten. Beer and ale must also be avoided. Bourbon, scotch, and rye whiskey may be consumed without ill effect. Commercial wheat starch is available for baking. Pastries tend to be flat and crumbly because the property of making dough is dependent on gluten. Rice, soy bean, maize, and potato flour provide an adequate substitute for wheat and rye. Amatuzio¹³ advocates the use of a full diet with the restriction only of long chain fatty acids. He has followed 3 patients for two years and has noted normal fecal fat excretion in 2 and moderately increased excretion (12 gm.) in 1 patient. These patients are able to tolerate gluten well. Their dietary fat consists only of coconut oil.

Gardner,¹⁴ in an excellent review of tropical sprue, relates that this disease is endemic in the Far East, India, and the Caribbean. Unsaturated fats are common in the diet in these areas. In Africa, where dietary fat consists mostly of saturated oils, sprue is very rare. In the Caribbean countries of Puerto Rico and Cuba, sprue is common. Dietary fat in these countries is largely lard, whereas in Jamaica, where coconut oil is the principle dietary fat, sprue is again very rare.

CONSTIPATION AS A SYMPTOM

Constipation is one of the most common manifestations of anxiety that confronts the clinician today. It is usually a manifestation of the irritable bowel syndrome or rectal constipation. Constipation results from decreased intestinal motility, colonic spasm, and increased water absorption. There are infrequent evacuations of "hard, dry, small pellets or the passage of long, narrow, ribbon-like or pencil-shaped stools resulting from spasm."¹⁵ Grace and associates¹⁶ feel that constipation is a reaction to stress in which the skeletal muscles are brought into a state of being "ready for action." Rectal constipation results from a failure of the defecation reflex. This is usually the result of conscious inhibition of the defecation urge. Dietary treatment of this symptom includes a high-residue diet providing bulk to the colonic contents and stimulating peristalsis. This diet includes fruits, vegetables, coarse breads, cereals, water, and foods which ferment slightly. Extra fats may be given if well tolerated. Residue is dependent to a large extent on vegetable fiber or cellulose. The human digestive tract is unable to digest cellulose. Animal fiber is composed chiefly of collagen, a protein

which can be converted to gelatin and digested and absorbed. Fruits, vegetables, and whole grain supply abundant fiber. Refined grain loses much of its fiber. Dried fruits, seedy fruits, fruits with skins, and leafy vegetables (preferably raw) with coarse fibers are satisfactory. Bran contains very large quantities of fiber. Foods which ferment are also helpful for constipation. These substances act by releasing minute air bubbles which penetrate the fecal mass making it bulkier and softer. These foods include honey, molasses, corn syrup, marmalades, jams, onions, cauliflower, and spinach.

DIARRHEA AS A SYMPTOM

The diarrheal component of the irritable bowel syndrome is characterized by the passage of a normal stool in the morning followed by the passage of one or two loose stools in the next hour. The same pattern may follow the evening meal. Increased parasympathetic activity results in increased peristalsis and secretion of mucus. Irritants, such as castor oil, cause increased mucus and peristalsis. Fecal material enters the colon as a fluid and is semisolid at the splenic flexure and solid at the rectum. Rapid propulsion through the colon then results in a liquid stool.

Mendeloff¹⁷ states that the 3 most common causes of chronic diarrhea are (1) diarrhea of nervous origin, (2) chronic ulcerative colitis, and (3) neoplasms. Rosenblum and Cummins¹⁸ noted decreased motility of the small bowel and sigmoid during natural sleep and after administration of Amytal. Code and associates¹⁹ used intestinal balloons to study a patient with ulcerative colitis. Giant propulsive contractions were noted in the lower ileum, which cleared it of fecal contents.

Dietary management of diarrhea consists of a low-residue, low-fat, nonirritating diet. Obvious offending foods include fruits, vegetables, coarse breads, and cereals. In acute gastroenteritis or a severe exacerbation of chronic ulcerative colitis,²⁰ it is best to eliminate all oral intake for a short while. Foods in a low-residue diet are easily digested. Meats are ideal for this type of diet planning. Other foods in this group include gelatin, sucrose, dextrose, concentrated broth, hard-boiled eggs, liver, rice, and cottage cheese. Obvious foods to omit are those previously mentioned. Irritating foods to be omitted include pepper, mustard, horseradish, vinegar, smoked fish and meats, and olives. Further details are contained in a diet manual or a dietetic textbook.²¹ Brown²² reported a case of a patient with regional enteritis in whom obstruction oc-

curred four separate times following the ingestion of corn. For the debilitation accompanying ulcerative colitis and regional enteritis, a high-calorie, high-protein content is recommended. Barger²⁰ recommends a diet containing 3,000 calories with 145 gm. of protein. Milk is high in residue but is tolerated well by some patients and should be used liberally. Many patients tolerate it poorly. This may be because of its residue, or it may be an "allergic" reaction.²³

GASTROINTESTINAL ALLERGY AND FOOD FADS

Food fads are myths which have been handed down from an age which believed in "black magic." Tomatoes, for instance, supposedly clear the brain, are a tonic for the liver, and cause cancer. Onions are good for insomnia, aid weak digestion, and cure a cold. Food fads will be discussed no further except to relate that the claims made for them are generally untrue. For a complete discussion of food fads, consult *Nutrition and Physical Fitness*.²⁴

Andresen²³ relates that food allergy is as common in the gastrointestinal tract as in the skin or mucous membranes of the respiratory tract. He points out that Lucretius, in the first century B.C., said "one man's meat is another man's poison." Symptoms include nausea, crampy abdominal pain, vomiting, and diarrhea. Gray²⁵ found that he could passively sensitize the mucous membranes of the ileum and colon. Reactions in such cases consisted of edema, hyperemia, and excessive production of mucus. Kolser and associates²⁶ feel that other manifestations of allergy involving the skin and/or mucous membranes of the respiratory tract should be present. Alvarez²⁷ points out that 25 per cent of an unselected group of 500 patients were sensitive to cow's milk. Most patients rapidly become aware that a particular food disagrees with them and rapidly abandon it. Foods most often incriminated include milk, eggs, wheat, potatoes, oranges, tomatoes, coffee, tea, chocolate, condiments, and some fish. Symptoms may occur within five minutes but sometimes as late as twelve hours after the offending food has been ingested. If allergy is suspected, the patient is instructed to record all food ingested. The offending agent is many times easily discovered with this bit of detective work. Elimination diets may be used. Treatment by desensitization is unsatisfactory. Relief of symptoms follows avoidance of the offending food.

CASE REPORT

History. A 29-year-old shoe salesman was admitted to Veterans Administration Hospital, Minneapolis, on December 17, 1958, because of weakness, weight loss,

and diarrhea of six months' duration. The present illness began with the onset of epigastric gas pains preceded by ten days of excessively foul smelling stools. He was hospitalized for four days at St. Mary's Hospital, Minneapolis, in July 1958. Four and one-half months before, he began to have frothy, brown, mushy stools that floated but were not foul smelling and eructation occurred. He had a weight loss of 25 lb. He also complained of revulsion, even vomiting with meat. He was hospitalized again early in August for four days, in late August and September for thirty-eight days, and in October for ten days, when an extensive work-up was done. Roentgenograms showed an atonic bowel. A jejunal biopsy revealed findings of idiopathic sprue. He was treated with vitamin B₁₂, potassium chloride, penicillin tablets, thyroid, Betalin, Folvite, and folic acid. On admission in October, he was given 40 units of ACTH and placed on a low-fat, low-carbohydrate diet at a time of increased stools. He showed little ability to gain weight. At the time of admission to Veterans Administration Hospital, he had continued to lose weight (a total of 40 lb.) and had noticed an increased number of stools, weakness, ankle edema of two weeks' duration, and dry skin. His hair had been falling out for one week. Nocturia had also occurred for the last six months. He stated that he had had mushy stools in the past on occasions. Bronchopneumonia was diagnosed as a child, but development was normal. No familial difficulty was revealed. He had had no abdominal pain or jaundice, but he did drink some in the service. His fraternal grandmother had diabetes at 65 years of age. The patient had an appendectomy at 9 years of age.

Physical examination. The patient was an extremely thin young man in a cachectic condition but in no particular distress. His weight was 113 lb., temperature 98.4° F., pulse 84, and blood pressure 96/66. Conjunctivae were pale. His teeth had many fillings but were otherwise in good repair. Ribs were prominent. Examination of the heart was normal. His abdomen had a soft, doughy feeling with multiple succussion splashes. No masses or tenderness could be elicited, but peristalsis was visible. There was 2+ pitting edema of the feet and ankles and 1+ of the knees. His skin was dry with a powdery feeling, and his fingers were questionably cyanotic with pale nail beds. A few shotty nodes were noted in the inguinal region.

Laboratory findings. White blood count was 5,200 with 79 per cent neutrophils, 19 per cent lymphocytes, and 2 per cent monocytes. Platelet count, coagulation and bleeding time, and erythrocyte sedimentation rate were normal. Hemoglobin was 15.4 and hematocrit 46. His urine had a specific gravity of 1.008 and a trace of albumin. Urine amylase was normal. A chest x-ray was normal. Abdominal films showed diffuse haziness. Radiologic examination revealed duodenitis and jejunitis with flocculation of barium. Demineralization of bones was noted. Barium enema showed enlarged colon. A cholecystogram was normal. Cholesterol was 110, zinc turbidity 4.3, cephalin flocculation 3+ and 4+, blood urea nitrogen 4, albumin-globulin ratio 1.4/2, sodium 140, potassium 3.7, carbon dioxide 21.9, and chloride 109. Carotene was 10 gamma per cent and fell to 4 gamma per cent on December 30 after loading. Calcium was 4.4, phosphorus .7, and prothrombin time was 23 per cent. On December 31, albumin-globulin ratio was 1.3/3.1, prothrombin time 76 per cent, and alkaline phosphatase 8.9. On January 8, calcium was 6.7, phosphorus .9. On January 13, total protein was 5 and albumin-globulin ratio 2.1/2.9. On January 19, carotene loading was 58 gamma per cent and rose to 78 gamma per cent. Gastric

secretion contained 52 per cent free acid after histamine injection. Stool contained 55 gm. of fat and 3.6 gm. of nitrogen after a measured fat but otherwise unrestricted diet. Basal metabolic rate was -8.5 per cent. Glucose tolerance reached a satisfactory level of 88 mg., 110 mg. in one hour, 122 mg. in two hours, and 104 mg. in three hours. The Minnesota Multiphasic Inventory suggested extreme immaturity.

Hospital course. On bed rest, the patient lost weight and weighed 104 lb. ten days after admission. For the most part, his edema cleared. Day and night urine volumes were studied and showed consistently higher night values. Typical day values were 500 to 775 and 1,250 to 1,600 at night. Without supplemental calcium, latent tetany developed on December 28. Calcium was 4.4 mg. per cent and phosphorus .9 mg. per cent. Numbness developed all over his body. His head felt big, and a positive Trousseau sign was present. All symptoms cleared after administration of calcium gluconate four times a day. At this time, he was given oral calcium lactate and supplements four times a day for ten days. On December 29, he was placed on a gluten-free diet. Since that time, he has gradually improved and has gained 30 lb. He felt better after three days on the diet. Present medication includes folic acid, calcium lactate, vitamin A, Betalin, vitamins D and B₁₂, and Synkavite.

SUMMARY

Dietary management of some disorders of the gastrointestinal tract have been discussed, and a case report has been presented. Dietary therapy is very rewarding in the treatment of many disease processes. Close cooperation with a trained dietitian is advised.

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ELEVATION OF blood ammonia and Bromsulphalein values occurring at the same time in patients with upper gastrointestinal bleeding is practically diagnostic of cirrhosis. Twenty-five of 26 hemorrhagic patients with blood ammonia values higher than 150 μ g. per 100 cc. and Bromsulphalein retention greater than 15 per cent had cirrhosis. If neither determination is elevated, a diagnosis of cirrhosis may be excluded.

GERALD A. BELKIN, M.D., and HAROLD O. CONN, M.D., Yale University, New Haven, Connecticut, and Veterans Administration Hospital, West Haven, Connecticut. *New England J. Med.* 260:530, 1959.

Diarrhea after vagotomy performed with gastroenterostomy is prevented by preserving the branch of the vagus innervating the celiac plexus. Incidence of diarrhea following vagotomy varies from 30 to 40 per cent, and although most patients are not greatly disturbed, a few have significant and permanent distress.

In 25 patients in whom vagotomy and gastroenterostomy were done, both the celiac and gastric divisions of the posterior vagus nerve were sectioned above the site of the division to the celiac plexus. In another 25 patients who underwent the same operation, the celiac division was preserved. In both groups, the anterior vagus nerves were sectioned. The incidence of postoperative diarrhea in the control group was 40 per cent, but none of the patients with an intact celiac branch had diarrhea.

Section of the gastric division of the vagus nerve is facilitated by dividing the left gastric artery and vein. Preservation of the celiac division of the posterior vagus does not interfere with complete gastric vagotomy.

HAROLD BURGE, M.B., and PETER A. CLARK, M.R.C.S., West London Hospital Medical School. *Brit. M. J.* 5130:1142, 1959.

The Use of Adrenal Cortical Compounds in Hemorrhagic Shock

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SINCE THE INTRODUCTION of cortisone and related adrenal cortical compounds, many clinical uses for them have been proposed. Their value has been well established, for instance, in states of adrenal cortical insufficiency and in severe allergic conditions. However, some of the applications have been empirical and supported only by clinical impressions. Such has been the case in the use of adrenal cortical compounds in shock. There are numerous reports in the medical literature citing instances in which the use of intravenous hydrocortisone has appeared to be lifesaving when administered to patients suffering from various types of shock as characterized by the hypotensive state.¹⁻³ Since it is well known that there is a relationship between blood pressure and adrenal cortical function, it was only natural that adrenal cortical compounds would be tried in shock.

Several investigators have reported experiments in which they tested the effects of both cortisone and hydrocortisone on hemorrhagic shock.⁴⁻⁶ In the first such experiments published by Howard and DeBakey,⁴ cortisone was administered in doses of 50 to 200 mg. intramuscularly before operation, during the shock period, and after retransfusion. Under the conditions of their experiments, they concluded that cortisone was "of no apparent benefit to these animals and

Blood Pressure and Pain

Severe pain can disturb blood pressure. A good example is eclampsia when a woman is in labor and continuous caudal anesthesia is being used. The blood pressure falls markedly while the anesthesia lasts, and, as it wears off, the blood pressure mounts and the convulsions begin. With injection of more local anesthetic into the caudal canal and the production of anesthesia, the blood pressure will drop immediately so that other means of influencing blood pressure, such as those described in the paper *The Use of Adrenal Cortical Compounds in Hemorrhagic Shock* by John E. Connolly, M.D., can be employed. In this paper, Dr. Connolly emphasizes a factor in hemorrhagic shock in which the adrenal cortical compounds become important and stresses that the timing of administration must not be delayed. This is a new problem which was brought on by the widespread use of cortisone and, in an emergency case, can appear without warning. Where ordinary means of treating shock fail, one must not wait too long to resort to the use of hydrocortisone intravenously. This is important information to have, and it is hoped that the paper will be widely read.

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it did not alter the pattern of shock." The time and the intramuscular route of their administration differed from our experiments.

In 1957, Knapp and Howard⁵ again reported the failure of hydrocortisone in hemorrhagic shock. In this study, hydrocortisone was admin-

Table 1. Hemorrhagic Shock

SHOCK LEVEL	DURATION OF SHOCK	NUMBER OF ANIMALS	SATISFACTORY RESPONSE TO INTRAVENOUS HYDROCORTISONE		DURATION OF RESPONSE
	MIN.		NUMBER	AVER. SYSTOLIC BP MM. HG.	MIN.
30 mm. Hg	5	3	3	90	120 to 150
	15	2	1	95	120
	25	1	0	—	—
	45	2	1	100	100
40 mm. Hg	5	1	1	105	135
	20	3	3	95	60 to 300
	25	1	1	80	120
	30	7	6	90	30 to 110
	45	2	0	—	—
50 mm. Hg	5	1	1	100	135
	15	2	2	100	15 to 270
	30	7	5	100	45 to 420
	45	3	1	90	90
	90	2	1	80	15
		37	26		

Fig. 1. Table showing results of the 37 dogs administered hydrocortisone.

istered intravenously in doses of 100 mg, several hours after the hypotensive state had been reached and just before retransfusion was begun. Our results are in agreement with theirs, namely, that if the drug is administered after the period of irreversibility has been reached no beneficial effect will accrue. Frank and co-workers⁶ also reported failure of cortisone to effect animal survival in hemorrhagic shock. They, however, did not employ large doses of hydrocortisone intravenously soon after the shock state had been reached.

In spite of these negative experimental reports, personal observations on the effectiveness of intravenous hydrocortisone in several patients in shock prompted us to reinvestigate its value in the research laboratory. The following is a case history on such a patient.

P. L. (History furnished by Dr. E. J. Harris, San Mateo, California.) The patient suddenly collapsed on the ward while recuperating from an operation in which a segment of the abdominal aorta was replaced by a homograft. No blood pressure or pulse was obtainable, and the apex beat was barely palpable. 200 mg. of hydrocortisone was administered immediately by vein. The blood pressure rose to 70/40 mm. Hg and remained there for thirty minutes. During this time a venous cutdown was performed and norepinephrine was begun, which further elevated the blood pressure to 100/60. Two hours later, cross-matched blood was available and a successful replacement of the ruptured homograft was accomplished. The patient recovered uneventfully.

METHODS

The standard shock preparation of Wiggers was adopted.⁷ Mongrel dogs were anesthetized with barbiturates. Catheters were placed in both femoral arteries, one for bleeding the animal and the other for blood pressure monitoring through a mercury manometer. A catheter was placed in one femoral vein for administration of blood and drugs, and the animals were bled into plastic bags containing 120 ml. of ACD solution B. Bleeding was carried out rapidly until a mean pressure of 50 mm. Hg was reached. This pressure was maintained for ninety minutes by occasional small withdrawals of blood. The amount of bleeding required to reach 50 mm. Hg was roughly 50 ml. per kilogram of body weight. After the ninety-minute period, further blood was withdrawn to reduce the blood pressure to 30 mm. Hg. This pressure was maintained for forty-five minutes. Small infusions were given if the pressure tended to decline toward the end of this period. At the end of this time, the entire amount of blood that had been withdrawn was reinfused. Wiggers reported an 82 per cent mortality within six hours after reinfusion. Twelve control dogs were bled in this manner. Thirty-seven additional dogs were bled according to the above protocol, but, to test the effects of our drug, 100 to 300 mg. hydrocortisone* dissolved

*The hydrocortisone used was Solu-Cortef, which was kindly supplied by Dr. Hubert C. Peltier of the Upjohn Company.

in 2 to 4 ml. of water was given intravenously at various times during the bleeding cycle. If the administration of hydrocortisone elevated the blood pressure, the length of time that the elevation was maintained was recorded.

RESULTS

Of the 12 control dogs, 11 died of irreversible shock within twelve hours. Figure 1 shows the results seen in the 37 dogs administered hydrocortisone. Except in 2, the drug was uniformly successful in elevating the blood pressure to safe levels (90 to 100 mm. Hg) when administered within thirty minutes after a mean pressure of 40 to 50 mm. Hg had been reached. Occasionally the hydrocortisone was successful in elevating the blood pressure for as long as forty-five minutes after a pressure of 40 to 50 mm. Hg had been reached. But the drug had no effect after this forty-five-minute period. The severity of this shock preparation is attested to by the death of 13 dogs, not included above, whose blood pressure suddenly fell to fatal levels while attempt was being made to maintain the thirty-minute period of shock. The average amount of drug required was 200 mg. for dogs weighing 12 to 20 kg. Occasionally 100 mg. was successful in producing a blood pressure response, and more often 300 mg. was required. If dosage of 300 mg. was unsuccessful in effecting a response, larger amounts of hydrocortisone were of no avail. If the hydrocortisone was successful, its effect was almost always seen within five minutes after administration and never longer than ten minutes later. When the drug was administered early and was successful in elevating the blood pressure to pressures over 80 mm. Hg, the effect of the single injection usually extended over an average period of three hours. Figure 2 shows a diagram of a typical experiment in which a dog was rapidly bled to a blood pressure of 40 mm. Hg and held there for thirty minutes, at which time 300 mg. hydrocortisone was given intravenously. Within a few minutes, the blood pressure rose to 115 to 120 mm. Hg and remained there for a period of several hours.

DISCUSSION

Under the conditions of our experiments, intravenous hydrocortisone, if administered within thirty minutes after the induction of severe hemorrhagic hypotension, had a remarkable ability to restore blood pressure to near normotensive levels and maintain these levels for extended periods of time without the replacement of blood

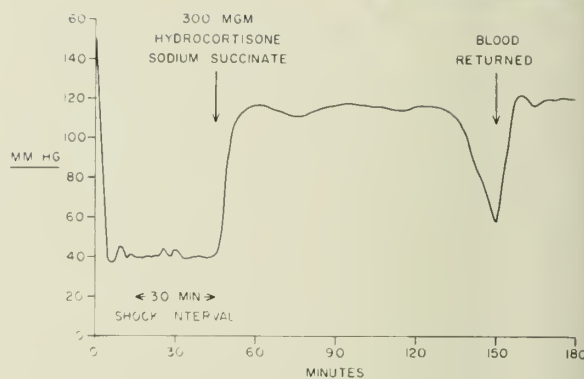


Fig. 2. The changes in blood pressure during a typical experiment are shown.

or the institution of other treatment. While the mode of its action is not apparent, several possible explanations can be listed. Zweifach⁸ and Fritz and Levine⁹ have demonstrated in adrenalectomized animals that vascular response to norepinephrine is lost and is restored only by the topical application of adrenal extracts or by the injection of cortisone. It is possible also that the metabolism of the adrenal cortical compounds is impaired in hemorrhagic shock and, as a result, the action of vasoconstriction does not occur, even in the presence of adequate amounts of circulating norepinephrine.

Although there may be decreased adrenal blood flow during shock, it is well known that the circulating levels of adrenal cortical hormones are high, suggesting that the difficulty lies in their metabolism during shock rather than in an inadequate output of the hormones.

It is also of interest to know whether this apparent ability of hydrocortisone to restore blood pressure is due to its mineralocorticoid or glucocorticoid action. Swingle¹⁰⁻¹² has reported that, in the adrenalectomized animal which has been allowed to go into shock and is deprived of food and water, administration of desoxycorticosterone or aldosterone will not alter the clinical course. On the other hand, he found that 2 α -Methyl 9 α -fluorohydrocortisone will invariably save similarly prepared animals. He attributes this lifesaving action to the drug's ability to shift intracellular fluid into the extracellular compartment, which he postulates is a function of its glucocorticoid function. This is opposed to the action of aldosterone and desoxycortisone, which have little if any glucocorticoid action, whereas 2 α -Methyl 9 α -fluorohydrocortisone, although a potent mineralocorticoid, has significant gluco-

corticoid effects. To date we have tried the comparative effects on hemorrhagic shock of several corticoids the actions of which are more primarily mineralocorticoid or glucocorticoid than hydrocortisone. For instance, aldosterone, a mineralocorticoid, has shown little or no effect on hypotension. Several prednisolone compounds with actions primarily those of the glucocorticoids, have shown somewhat similar effects on hemorrhagic hypotension as on hydrocortisone but these effects have been definitely less pronounced. Thus, in the light of our present knowledge, we might postulate that the apparent effect of hydrocortisone on hemorrhagic shock occurs more through its glucocorticoid and mineralocorticoid actions than either separately.

It would appear from our experiments that, in the event of hemorrhage severe enough to lower the blood pressure below 80 mm. Hg, one should first attempt immediate replacement of the blood lost. However, if blood is not immediately available or the hypotension does not respond to its administration, a large dose of hydrocortisone should be given intravenously within thirty minutes after the hypotensive state has commenced. Our experiments would suggest the comparable adult human dose to be from 500 to 1,000 mg. However, a number of clinical cases in which response occurred with 100 mg. have been verified. In addition, it is known that the dog requires and tolerates higher doses of adrenal corticoids per kilogram of body weight than does the human. Therefore, the initial dose recommended is 200 mg. of hydrocortisone intravenously.

The common practice of giving norepinephrine during such emergencies bears further investigation. Close and co-workers¹³ have shown that, when norepinephrine is given during and after hemorrhagic shock, the mortality rate is twice that of control animals. They conclude that an increase in vasoconstriction is harmful during hemorrhage, "though administration of pressor agents may exert a considerable and beneficial constrictor effect peripherally, they may also overcome the local metabolic factors which normally operate to assure adequate blood flow to the splanchnic bed, liver, and to a lesser extent the heart and skeletal muscle."

The simplicity of administering a single injection

of an easily carried drug leads us to hope that the development of irreversible shock may be prevented until such a time as blood or intravenous fluids may be given in hemorrhagic shock.

SUMMARY

An experimental study of the effect of intravenous hydrocortisone on hemorrhagic shock in the dog is described. Hydrocortisone administered in doses of 100 to 300 mg. effected spectacular and sustained elevation of the blood pressure of dogs in profound hemorrhagic shock if it was administered within thirty minutes after the state of severe shock was reached. It had no effect on restoration of blood pressure if given later than forty-five minutes after the severe shock state had been induced. A discussion of the possible mechanisms of its action in hemorrhagic shock is presented, and the use of hydrocortisone as an emergency treatment following severe hemorrhagic shock is described.

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Current Literature on Pain

THE TREATMENT OF HYPEREMESIS GRAVIDARUM WITH HYPNOTHERAPY, by S. W. GIORIANO and R. F. MASCOIA: *Am. J. Obst. & Gynec.* 73: 444-447, 1957.

"Nausea and vomiting occur in about half of all pregnancies, but fortunately pernicious vomiting is much less frequent. . . . In view of the urgency of some situations and the dangers of dehydration and acute yellow atrophy, however, and recognizing that psychotherapeutic techniques offered the best chance of success, Angalo in 1942 reported a case of hyperemesis gravidarum cured by hypnosis. . . . In spite of the remarkable results with hypnotherapy, a search of the literature shows that very few cases have been reported. . . .

"Since 1950, our most intractable cases of hyperemesis gravidarum have been chosen for special study and hypnosis. Inasmuch as exact criteria could not be stated, our clinical experience was the sole factor in determining severity. Twelve cases have thus been collected. . . . While the number of cases is small, it is encouraging to note that all 12 patients benefited from this therapy. All the mothers recovered and have been followed up to this date. All of the pregnancies resulted in normal babies, except [one] . . . who had a spontaneous abortion at 12 weeks. She had also had a previous spontaneous abortion."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49, p. 77. Copyright by JOHN S. LUNDY.

POSTANESTHETIC NAUSEA, RETCHING AND VOMITING. EVALUATION OF CYCLIZINE (MAREZINE) SUPPOSITORIES FOR TREATMENT, by J. J. BONICA, WILLIAM CREPPS, BENJAMIN MONK, and BLAIR BENNETT: *Anesthesiology* 19:532-540, 1958.

"Despite improvements in anesthetic techniques and agents, the almost demoralizing symptoms of nausea, retching, and vomiting still occur with sufficient frequency as to constitute, from the patient's viewpoint at least, the most important complications of surgical and obstetrical anesthesia. . . . Cyclizine (Marezine), has been studied to evaluate its efficacy as a prophylactic as well as a therapeutic agent. This report concerns the evaluation of this drug with a placebo following rectal administration for the treatment of nausea, retching and vomiting. . . .

"The incidence of postanesthetic nausea, retching, and vomiting was studied in 2,827 patients who received various forms of general and regional anesthesia for diversified surgical operations. Of these patients, 627 or 22.3 per cent manifested retching and/or vomiting and 156, or 5.4 per cent, experienced only nausea, for an over-all incidence of emetic symptoms of 27.7 per cent. . . . Cyclizine produced complete or partial relief in approximately 93 per cent of the patients, as compared with 60 per cent of the patients who obtained similar degrees of relief with a placebo suppository. This beneficial effect is accomplished with a minimal incidence of side effects.

"The use of ether as a primary anesthetic agent was followed by the highest incidence of emetic symptoms, with cyclopropane next in order. Of the general anesthetic agents, thiopental employed alone produced the

lowest rate of emetic symptoms, with nitrous oxide-thiopental next in order of increasing rate. The addition of meperidine to the latter combination augmented the incidence of emetic symptoms threefold.

"Patients who received regional anesthesia experienced a significantly lower incidence of emetic symptoms. Local infiltration or field block was followed by the lowest rate, while spinal techniques (subarachnoid, spinal epidural, and caudal block) were associated with the highest incidence. The administration of general anesthesia, made necessary by failure of a regional technique to provide adequate conditions, increased the rate of emetic symptoms. . . . Upper intra-abdominal procedures involving the stomach, duodenum, and gallbladder were associated with the highest rate of nausea, retching, and vomiting, while perineal procedures and operations involving the extremities were followed by the lowest incidence of emetic symptoms. The longer the time required to complete the operation, the greater was the incidence of emetic symptoms."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49, p. 49. Copyright by JOHN S. LUNDY.

THE DIAGNOSIS AND MANAGEMENT OF SHOCK, by E. S. BREED: *M. Clin. North America* 41:669-683, 1957.

"The problem of shock has always been a confusing one, and will probably remain so for the following reasons: (1) The clinical appearance of the patient, although dramatic, is not specific and is associated with both innocuous and lethal states. (2) A great many unrelated causes are capable of producing this same clinical syndrome. (3) By common usage, the word 'shock' has come to mean both the clinical appearance of the patient and the biochemical changes found only under lethal circumstances. This state of affairs has been further complicated by the addition of hypotensive drugs and their use in the production of hypotensive anesthesia, and the technique of hypothermia, to the therapeutic armamentarium of medicine. Use of these latter two procedures involves deliberate inducement in patients of many of the characteristics of the shock syndrome and has added further reason for discussing the problem. . . .

"The establishment of the cause of shock is a most important step. Once the patient is properly classified, the correct therapy can be selected. This is particularly important to avoid unnecessary waste of valuable supplies during a disaster, and even more so to avoid giving the patients the wrong type of treatment. . . .

"A patient admitted in severe shock due to acute gastrointestinal hemorrhage will . . . require about 2,000 cc. of blood to restore the blood volume to normal. Under these circumstances, placing the patient in Trendelenburg position and starting a rapid transfusion of type O Rh blood in the femoral artery, would be the most expeditious procedure. If such emergency blood is not available, . . . then a rapid saline infusion run in through a needle in the femoral vein would be the first step. . . .

"There appears to be no advantage of the arterial route over the venous as a method of volume replacement. . . . The various states of electrolyte loss respond well to replacement with sodium solutions, either iso-

tonic or hypertonic, as the degree of plasma concentration demands. . . .

"The use of controlled hypothermia in the seriously ill patient, in order to bring a temperature of over 103° F. down to normal and to hold it there as long as necessary, has yielded some good results and appears to offer definite advantages to certain types of patients. . . .

"Shock due to myocardial infarction may resolve spontaneously under the usual measures of oxygen and morphine, if the degree of shock is not severe. . . . In shock due to cardiac tamponade, the dramatic effects of pericardial aspiration have been well documented. Shock due to pulmonary embolism, if not immediately lethal to the patient, can be controlled by large doses of norepinephrine given, if necessary, in concentrated form,

to avoid overloading and pulmonary edema. Very large doses (64 micrograms/min.) may be required to obtain an adequate blood pressure in order to bring out a compensatory flow through both myocardium and lung. . . .

"Shock may occur as a manifestation of adrenal insufficiency. . . . The emergency therapy consists of infusing 100 mg. of hydrocortisone (100 mg. in 200 cc. of 50 per cent ethanol) diluted with 500 cc. of 5 per cent glucose intravenously at the rate of 100 cc. per hour after the blood pressure has been returned to normal. This may have to be continued for some time, depending on the circumstances."

From JOHN S. LUNDY and FLORENCE A. McQUILLEN: *Anesthesia Abstracts*. Minneapolis: Burgess Publishing Company, 1958, vol. 49, p. 28. Copyright by JOHN S. LUNDY.

Clinical Note . . .

What to Do?

ONE AFTERNOON a father and his 10-year-old boy came to the clinic. The former related that his son had had midabdominal pain since the previous night and had vomited once early in the morning. He also said that the family had been suffering with the "flu" for the past few days.

Examination revealed very little except for some tenderness in the right lower quadrant and umbilical region. There was no rigidity or rebound tenderness. The hemoglobin was 80 per cent, white blood count 7,200, and the urine was normal. Temperature was 98.8° F. A diagnosis of appendicitis was entertained, but, with a normal white blood count and the history of "flu" in the family, no emergency seemed evident. The patient was sent to the hospital for observation.

The following morning, the temperature was 102° F. There was still some tenderness in the same location as the day before but, again, no rebound tenderness or rigidity. The white blood count was 6,300, and other findings were insignificant. There had been no vomiting and no increase in pain.

Despite the normal white blood count, a laparotomy was performed. A large, suppurative, distended appendix was removed. The temperature varied between 102 and 103° F. that day and night.

The following day, he broke out with the rash of rubella, and the fever gradually subsided. He made an uneventful recovery and went home on the seventh postoperative day.

Trying to explain the normal white blood count on two occasions leads to the deduction that the leukocytosis of acute suppurative appendicitis may have been neutralized by the leukopenia of rubella, and the result was two normal white blood counts.

After years of attempting to diagnose appendicitis, it seems that the wisest course in this age of good anesthesia and capable surgery is to operate when in doubt, for a normal appendix is better removed than an abnormal one left to rupture.

R. D. NIERLING, M.D.
DePuy-Sorkness Clinic,
Jamestown, North Dakota



Archie McCannel, M.D.

1879-1959

WILLARD A. WRIGHT, M.D.

Williston, North Dakota

ARCHIE McCANNEL lived a full and rewarding life for eighty years, from his birth in Chesley, Ontario, on June 3, 1879, until his death in Minot, Wednesday, July 22, 1959. It has been my privilege to be his friend and associate in many activities for some thirty years. During this time, we served together on boards and committees and with other groups dealing with medical organizations and related affairs. I have always been grateful that, as a recognized medical leader many years ago, he was willing to advise, counsel, and direct me along medical paths which were then new to me.

I think the thing that endeared Archie to me and to others of my time was his enthusiastic interest in the younger doctors. If a young doctor needed encouragement, advice, and direction either in scientific medicine, methods of medical practice, or in the affairs of medical organizations, Archie was always ready to share his accumulated experience. Often, in the early years, we were easily discouraged. Archie could well understand such discouragement; no doubt he had experienced it himself. However, to him, discouragement merely meant a new challenge, and his loyal support and encouragement helped greatly in reviving our enthusiasms.

In later years, we of that particular medical generation recognized that this willingness to direct a struggling practitioner was only one phase of Archie's character. Archie had an enormous capacity for friendliness. He was an outgoing person, who, in a very short time, became very well-known wherever he was. He had the ability to develop warm friendships, which he had in many parts of the world, and these friendships were enduring because he continued to show a deep interest in his friends. He was interested in what they were doing and could always find a word of encouragement. Archie was by no means averse to dominating a conversation

or a group because, after all, he was a dominant type of individual. I think of him as being dominant, not domineering. He had, of course, strong ideas on most subjects and yet, sometimes with considerable effort, could be induced to accept, or at least not actively oppose, an opposite point of view.

In 1949, in my inaugural address as president of the North Dakota State Medical Association, I said of Archie: "I have heard it said that a certain Minot doctor is so well-known that if he were lost in the middle of the Sahara Desert some sheik would ride up, extend his hand, and say, 'Hello, Archie, what brings you here?' And, if Archie McCannel were to be found in that locality, it would probably be because he was using some of his boundless energy and tremendous enthusiasm to further a good cause.

"Archie has worked unceasingly for the good of North Dakota doctors, the people of North Dakota, and the city of Minot. He has been a good friend of all of us, and for many years has provided me with stimulation, sage advice, enthusiastic support, and the privilege of his friendship. For all this, I am extremely grateful and thankful to be able to acknowledge this debt."

Archie was a man of tremendous energy and extremely wide interests. Perhaps the fact that he had traveled extensively; had lived in two countries, Canada and the United States; and had studied in Great Britain, Germany, and Austria tended to widen his interests. Furthermore, his apparently unlimited energy permitted him to, or led him to, undertake and participate in a vast number of projects in addition to carrying on a very active practice in the field of eye, ear, nose, and throat. He was involved in countless organizations and programs, all of which led to improved opportunities for people in his city, state, and the country as a whole. He gave freely

of his time and other resources to his church, the Red Cross, the Y.M.C.A., the Boy Scouts, the Rotary Club, the Masons, and many other civic groups. It was extremely fortunate for the people and the medical profession of North Dakota that Archie was a member of the original State Welfare Board and had a great deal to do with the development of welfare policies in the formative stages. For years, we have benefited from his vision in this field, which, at that time, was completely new and uncharted. While he had deep conservative principles and a strong feeling for established order, he was willing to adjust and develop his thinking in the socially changing world in which we live. He was a born leader and exerted leadership in every organization with which he was connected. However, he was also a good follower, and, in instances in which he accepted this role, he gave loyal support to those with whom he was associated.

Archie served medicine in many capacities. He was a member of the State Board of Medical Examiners for twenty-five years, president of the North Dakota State Medical Association in 1936, past chairman of the Council, a member of many important committees, and a member of the Advisory Council for the Medical Centre. He was a fellow of the American College of Surgeons, a member of the Council of the Academy of Ophthalmology and Otolaryngology, and several other scientific organizations.

Serving on the State Board of Higher Education, he made significant contributions to education in North Dakota, with particular emphasis on medical education. He was in a position to act as guide and advisor during a period of growth of our medical school, which is now a thoroughly modern and acceptable two-year school. As a tangible remembrance of his services in this field, the new rehabilitation center building at the University of North Dakota was named the McCannel Building.

While participating in and directing many advances in the social and economic field and in medical education, he always displayed a thorough understanding of the fundamental principles governing medical practice and the delivery of medical service. He was always willing to adapt his principles to the changing social order in which we found ourselves living, although he would never forsake a fundamental principle. He firmly believed in the right and duty of the individual to properly provide for himself and family, and he showed eminent success in so doing. Archie set very high standards of conduct for himself in both the fields of medical practice and in everyday living. He had a steadfast, abiding love of medicine as a calling and was sometimes impatient with those who were not able to live up to his high standards of medical conduct and civic consciousness; yet, while recognizing their shortcomings, he could be tolerant and forgiving of those with lesser standards, ambitions, and abilities. When Archie believed in some enterprise, it was characteristic of him to immediately set out to accomplish it.

He brought with him from Canada a love of curling and organized a curling club and assisted in the building of a curling rink in Minot, which still is in operation. Also, in later years, when golf began to seem a little too strenuous, he developed an interest in and fostered provisions for lawn bowling.

Life with Archie must have been at all times strenuous and sometimes confusing, with his many enthusiasms and activities, but was probably seldom dull. Married to Archie for fifty-one years, Mrs. McCannel, the former Violet Rose and a nurse, has retained a serene and calm attitude which endears her to all who know her. There are four children: Doctor Donald A. McCannel, a urologist in Beverly Hills; Doctor Malcolm McCannel, an ophthalmologist in Minneapolis; Mrs. Lavton Osborn of Dickinson, North Dakota; and Mrs. Gordon Aamoth of Fargo, North Dakota.

TRANSACTIONS

THIRTEENTH ANNUAL MEETING

WOMAN'S AUXILIARY TO THE NORTH DAKOTA STATE MEDICAL ASSOCIATION

Bismarck, North Dakota, May 2, 3, 4, and 5, 1959

The thirteenth annual meeting of the Woman's Auxiliary to the North Dakota State Medical Association was held at the Apple Creek Country Club, Monday, May 4, at 9:00 A.M. The meeting was formally opened by Mrs. V. J. Fischer, president.

The pledge of loyalty was given by Mrs. John M. Van der Linde, state president-elect, and repeated in unison by the members present.

In the absence of Mrs. R. F. Gilliland, first vice president, Mrs. J. W. Jansonius, recording secretary, gave the Invocation.

Mrs. Fischer introduced our honored guest, Mrs. William Mackersie, Detroit, Michigan, North Central Regional vice president of the Auxiliary to the A.M.A.

Mrs. P. O. Dahl, president-elect, Sixth District Medical Society, gave the address of welcome. The response was given by Mrs. R. L. McFadden, Jamestown.

The roll was called by the secretary, and the following were present:

State Officers: Mrs. V. J. Fischer, president; Mrs. J. M. Van der Linde, president-elect; Mrs. R. W. McLean, first vice-president; Mrs. J. W. Jansonius, recording secretary; Mrs. Darwin Kohl, corresponding secretary; and Mrs. Carl Baumgartner, treasurer.

Committee chairmen: Mrs. J. D. Cardy, nominating committee; Mrs. M. M. Heffron, press and publicity; Mrs. Robert Hankins, editor; Mrs. Clyde Smith, legislation; Mrs. G. D. Gertson, Historian; Mrs. Lester Wold, A.M.E.F.; Mrs. E. L. Grinnell, parliamentarian; Mrs. S. E. Shea, mental health; Mrs. Henry Kermott, Jr., revisions; Mrs. L. L. Hoopes, safety; Mrs. Neville Turner, Today's Health; Mrs. L. T. Longmire, resolutions; Mrs. R. H. Waldschmidt, finance; Mrs. B. A. Mazur, student loan fund.

District presidents: Mrs. E. A. Haunz, Grand Forks; Mrs. Philip Dahl, Bismarck.

Delegates: Mrs. O. A. Sedlak, Fargo; Mrs. Calvin Fercho, Fargo; Mrs. Robert Ulmer, Fargo; Mrs. T. Q. Benson, Grand Forks; Mrs. A. L. Cameron, Minot; Mrs. Wesley Levi, Bismarck; Mrs. M. A. K. Lommen, Bismarck; Mrs. R. L. McFadden, Jamestown; Mrs. R. D. Nierling, Jamestown.

Councillors: Mrs. Philip Woutat, Grand Forks; Mrs. O. M. DeMouly, Flasher; Mrs. Keith Vandergon, Hillsboro; Mrs. Douglas Lindsay, Fargo; Mrs. R. W. Rodgers, Dickinson, and Mrs. J. D. Craven, alternate for Mrs. Andrew Sathe, Williston.

The following "In Memoriam" for Mrs. W. F. Sihler, Devils Lake, and Mrs. Robert D. Campbell, Grand Forks, was given by Mrs. R. W. McLean:

"The auxiliary is saddened by the loss of two of our members—Mrs. W. F. Sihler of Devils Lake, and Mrs. Robert D. Campbell of Grand Forks.

"Mrs. Sihler passed away March 5, 1959, after a lingering illness. As the wife of one of our pioneer physicians, she will long be remembered in the community for her distinctive personality and gracious hospitality.

"Mrs. Campbell passed away January 23, 1959, at the age of 88, a loved and admired member of the Grand Forks community. She was active in all cultural and medical circles. Recently, Dr. and Mrs. Campbell provided a generous endowment for the University of North Dakota Medical Schools.

"We of the Auxiliary extend our deepest sympathy to Dr. Sihler and Dr. Campbell and their families at their loss and offer this Memoriam."

Our Parliamentarian, Mrs. E. L. Grinnell, read convention rules of order from our Constitution and Bylaws, Article V, Section 1.

Mrs. Fischer presented the convention chairman, Mrs. R. H. Waldschmidt.

Mrs. R. D. Nierling, reading committee, moved that we accept the minutes of the twelfth annual meeting,

Woman's Auxiliary to the North Dakota State Medical Association, as published in the October 1958 issue of THE JOURNAL-LANCET.

Mrs. Fischer stated that in the interest of brevity we were inaugurating a two minute report plan. She then called for Reports of state officers. She reported that her president's message had been given to the House of Delegates, and would be published in the September 1959 issue of THE JOURNAL-LANCET.

Mrs. Baumgartner then read the treasurer's report:

Treasurer's Report Financial Statement, 1958-1959

Balance on hand July 30, 1958		\$1,702.85
<i>Receipts:</i>		
Sale 3 handbooks at \$0.50	\$	1.50
Dues: 319 members at \$4.00		1,276.00
1 associate member at \$1.00		1.00
6 delinquent dues at \$1.00		6.00
Student loan contributions		1,863.55
North Dakota Medical Society for essay contest		90.00
North Dakota Medical Society for convention expenses		200.00
Convention registration		100.00
	\$3,538.05	3,538.05
Total receipts		\$5,240.90
<i>Disbursements:</i>		
Mrs. V. J. Fischer, state president	\$	507.50
Mrs. Van der Linde, president-elect		117.50
Convention expenses		260.00
News, Views and Cues		188.00
Christmas present to M. Fremming		25.00
Standing committees (publicity and revisions)		28.66
Essay Winners:		90.00
Ellis Hagseth, Minot	\$50.00	
Lorelie Mayer, Richardson	25.00	
Bonnie Ness, Fargo	15.00	
National treasurer:		
320 dues, 1 honorary,		
6 delinquent at \$1.00		327.00
Bank charge		.30
Student Loan Fund, Dean Harwood		1,863.55
Balfour Co. (President's pin)		7.37
Total expenditures:	\$3,414.88	3,414.88
Balance on hand June 30, 1959		\$1,826.02

CECILE BAUMGARTNER, state treasurer

The following reports were then given by state officers:

Community Service Program Report, 1958-1959

Mr. Leo Brown, director of Public Relations, American Medical Association, says, "What you do unselfishly in the interest of others is basically community service, whether through the individual or the organization."

The activities of the members of our auxiliary have been outstanding and the communities of our state are grateful for the far-reaching and far-sighted work done by the district auxiliaries.

Our theme for the year "Safeguard Today's Health for Tomorrow," has been integrated into nearly all aspects of auxiliary projects. Promotion of *Today's Health* has gained momentum, as has interest in A.M.E.F. with its successful fund raising project of Christmas cards. Senior Citizen clubs, parimedical programs, Medical Student Wives' Auxiliary, and mental health education are closely associated with the Auxiliary, as are numerous other civic

services, such as Cancer society, PTA, community chest, Red Cross, Heart association, and Crippled Children's association, which have benefited by the generous work of our members.

Wherever you find doctors, you will find doctors' wives working to establish liaison with other groups interested in health.

We are proud of the North Dakota auxiliary for the outstanding work they have done for the good of others.

Mrs. R. W. McLEAN, Chairman

Membership Report, 1958-1959

There are 10 organized district medical societies in North Dakota and 10 district medical auxiliaries. There were no new districts organized during the past year.

At the time of the filing of this report, there were 321 members, with 312 regular members, 7 members-at-large, 1 honorary member, and 1 associate member.

There are 30 women who did not renew their memberships this year and 27 new members.

Mrs. JOHN M. VAN DER LINDE, Chairman

Program Report for 1958-1959

Please read the individual reports of our state standing committee chairmen, our district president's reports, and that of our state president to get a clear picture of the vast program and accomplishments of our North Dakota Auxiliary for the year 1958-1959. After doing so, one should realize that it is a privilege to belong to such an organization and be proud to say, "I am a member." It is evident that each year the doctor's wife is spending a little more time in developing the program of the Auxiliary. For this we are happy.

Our district auxiliaries meet on the average of four times per year. Three districts have printed programs for the year. Many make use of outside speakers and films for their programs.

The subscriptions to *Today's Health* should show a decided increase in years to come, as many of our members are giving gift subscriptions to individuals, libraries, schools, and offices. This should be encouraged. When people are educated as to the quality of this magazine much good will come from it—financially, educationally and physically.

Our auxiliaries are becoming less modest about giving their many accomplishments well-deserved publicity. They are realizing more each year that "By their deeds shall ye know them."

The response to the essay contest was tremendous in some areas, average in some, and "nil" in others, but I do hope that the state will continue to participate in this project for I feel that our children of today should be educated as to the advantages of free enterprise—for they are the leaders of tomorrow. The areas that received the greatest response to the contest made *personal* contact with the schools and individual students instead of mailing the information to the schools. Let us not be discouraged if the response was discouraging in some areas, for remember that if we have planted just *one* seed the crop that will be harvested from it will be great.

Mrs. Fischer, our state president, was the greatest inspiration to the district auxiliaries when she visited them during the year. Her enthusiasm in the aims of our auxiliary will bear fruit, I know, in the years to come.

Special recognition should be given to Southwest and Stutsman districts and to the community of Mott for their tremendous program for future nurses.

Perhaps more of us should begin our opening meeting with a pantomime entitled "Aims of the Auxiliary" as did Northwest District.

Much activity was evident this year in the majority of our projects, but perhaps next year we can give a "boost" to programs on civil defense, legislation and safety.

Mrs. R. F. GILLILAND, Chairman

Motion was made by Mrs. Longmire that we accept the reports of the state officers. Motion was seconded and carried.

The following reports were given by state chairmen:

AAPS Essay Contest Report

Four districts participated in the 1959 AAPS Essay Contest, with a total of 31 students submitting entries. Eleven essays were judged for the state prizes, which were furnished by the North Dakota State Medical Association. First place, prize \$50, was won by Ellis Hageseth, Minot; second place, \$25, won by Lorelie Mayer, Richardton; third place, \$15, won by Bonnie Ness, Fargo. The committee of judges was composed of Mr. H. Dean Stallings, librarian of the N.D.A.C.; Mrs. J. W. Snyder, executive director of the North Dakota Cancer Society; and Dr. O. A. Sedlak, president, North Dakota State Medical Association.

First district, Mrs. T. L. Donat, chairman, had two essays entered. First prize went to John R. Williams, Fargo High senior; and second to Bonnie Ness, Shanley High senior.

Southwest district, Mrs. C. R. Dukart, chairman, reports a magnificent response. Nineteen entries were received: 13 from Beach, 1 from Richardton, 3 from Mott, and 2 from Dickinson. The winners were: first, Lorelie Mayer, St. Mary's School, Richardton; second, Marie Hoff, St. Mary's School, New England; third, Judith Michels, Beach.

Mrs. K. Amstutz, chairman of Northwest district, received 3 essays. First place, Patricia Johnson, Minot High senior; second place, Marie Wolfe of Strasburg, Sacred Heart Academy junior; and third, Ellis Hageseth, Minot High senior.

Devils Lake district, Mrs. T. Longmire, chairman, had 7 entries, all from St. Mary's Academy in Devils Lake. The winners were all seniors: first, Aleda Joan Kirchoffner; second, Marilyn Liere; and third, Kathleen Erickson.

The high quality of the essays submitted and the difficulty in judging them is demonstrated by the fact that two of the state winners placed below first in their districts.

Through the efforts of Mrs. Heffron, our publicity chairman, we were able to determine why the A.A.P.S. essay contest is not on the list of contests approved by the National Association of Secondary School Principals, and therefore not actively supported by some of our public school principals.

In 1956, Dr. Mal Rumph, national chairman for the A.A.P.S. essay contest, appeared before the annual meeting of the N.A.S.S.P. Committee on National Contests in support of the application of the A.A.P.S. essay contest for placement on the approved list. The committee took issue with A.A.P.S. on several points:

1. Controversial nature of topics
2. Failure to agree on a single uncontroversial topic
3. Inadequate amount of awards
4. Unwillingness of committee to endorse new essay contests, and for these reasons voted against approving the A.A.P.S. essay contest.

In spite of this lack of support from the State Office of Public Instruction, I feel that we should continue to co-sponsor the contest.

In a letter to Mrs. Fischer dated October 16, 1958, Mr. Lyle Limond, executive secretary to the North Da-

kota State Medical Association, stated that prize money was available for the 1959 contest, and that he was under the impression that funds for the 1960 contest would again be designated by the Executive Council. Our state first place winner, Ellis Hageseth, Minot, placed eighth in the national contest and received \$75.

Mrs. THOMAS LONGMIRE, Chairman

Motion was made by Mrs. Cardy that the Essay Chairman take her proposal to increase the amount for prizes at a state level to the Medical society. Motion was seconded and carried.

American Medical Education Foundation Report

As of April 14, 1959, the sum of \$833.60 has been contributed for the American Medical Education Foundation in North Dakota. Of this total, \$408.10 was realized from the Christmas card sale. Of the remaining \$425.50, 6 districts contributed \$254.50. The remaining \$171 came from private contributions. Donations from any source will be accepted until May 15, 1959, at which time a final tabulation will be made and the funds sent to the A.M.E.F. executive office in Chicago. We hope if your auxiliary has not contributed as a group that they will do so before that time.

A letter went to each district requesting their feeling on another Christmas card sale and the consensus seemed opposed to it. If each district would pledge \$2 per member and decide within their own group how to raise this money we could contribute \$600 in addition to private contributions through memorials, etc.

I would like to thank the district chairmen of A.M.E.F. for their cooperation this year.

THELMA WOLD, Chairman

Motion was made by Mrs. Baumgartner that the remainder of the A.M.E.F. Christmas cards be brought to the fall board meeting. Motion was seconded and carried.

Motion was made by Mrs. Heffron that we continue our A.M.E.F. paper project in some form and that designs be presented at our fall board meeting. Motion was seconded and carried.

A certificate of award was presented to Mrs. L. L. Hoopes, Minot, for the largest contribution per member to A.M.E.F.

Bulletin Report

"Every Member a Subscriber" has been the 1958-1959 motto of the *Bulletin*, the official publication of the Woman's Auxiliary to the American Medical Association.

At convention time in 1958, there were 69 subscribers and at convention time in 1959, there are only 65. Do your part. Order your *Bulletin* today so that "Every Member will be a Subscriber."

Mrs. JOAN SATHE, Chairman

Historian's Report

The twelfth annual meeting and pre-convention Board Meeting of the Woman's Auxiliary to the North Dakota State Medical Association held in the Sky Room, Clarence Parker Hotel, Minot, May 4, 5, and 6, 1958, was presided over by Mrs. J. D. Cardy, president. Convention program is filed in the archives. Minutes and reports are officially recorded in the September and October 1958 issue of *THE JOURNAL-LANCET*. Minutes of the September 23, 1958, fall board meeting of 27 members, presided over by Mrs. Fischer, new president, are in the archives. *News, Views and Cues* carried delegates' reports by Mrs. Fischer, at the San Francisco national convention and Mrs. Van der Linde, president-elect, at the Chicago conference.

Honored guest speakers at the State convention were Mrs. M. A. Gold, Butte, Montana, fourth vice-president, Woman's Auxiliary to the American Medical Association; Dr. R. W. Rodgers, Dickinson, president, and Dr. O. A. Sedlak, president-elect of the North Dakota State Medical Association.

In Memoriam for Mrs. A. F. Panek, Milton, was read by Mrs. Gilliland.

Registration at state convention: 85. Total number of auxiliary memberships: 321, 1 associate, 1 honorary, and 7 members at large.

The A.M.E.F. Christmas card project voted in at the May 1958 state convention became a reality at the fall board meeting with decisions being made on acceptance of style, price, and distribution by motions made and carried.

Proposed revisions included change of name to By-laws instead of Constitution and Bylaws. New Bylaws were received April 8, 1959, and are filed in the archives.

Outstanding achievements, national and state, are quoted from *News, Views and Cues*: Mrs. S. C. Bacheller, Enderlin, nominee for office of regional vice-president of the Woman's Auxiliary to the American Medical Association, "calling for supervision of auxiliary activities in the twelve state North Central Region . . . and membership on the Board of Directors." She is president-elect and executive committee member of the North Dakota Heart Association and has been nominated for a second term to the National Board of the American Heart Association.

Mrs. Paul Johnson, Bismarck, is a board member and treasurer of the North Dakota Heart Association.

Mrs. Louis F. Pine, Devils Lake, author of "Life With(Out) Mother" published in *Columbia*, the K.C. monthly magazine.

1958 Convention Program

SUNDAY, MAY 4, 1958

- 12:00 Registration
- 1:30 Finance committee meeting
- 2:30 Student loan fund committee
- 4:00 Preconvention hoard
- 7:00 Informal mixer and buffet supper

MONDAY, MAY 5, 1958

- 8:45 Past presidents' breakfast
- 9:00 Registration
- 10:00 Opening session
 - Mrs. J. D. Cardy, president, presiding
 - Pledge of Loyalty: Led by Mrs. V. J. Fischer, president-elect
 - Invocation: Mrs. J. M. Van der Linde, first vice-president
 - Welcome: Mrs. Oliver Uthus, North West District, president
 - Response: Mrs. B. A. Mazur, First District president
 - Greetings: Dr. R. W. Rodgers, president, North Dakota State Medical Association
 - In Memoriam: Mrs. R. F. Gilliland, second vice-president
 - Reports of state officers, chairmen, and district presidents
- 12:30 Luncheon
 - Mrs. V. J. Fischer, president-elect, presiding
 - Address: Dr. O. A. Sedlak, president-elect, North Dakota State Medical Association.
- 2:30 Second business session
 - Mrs. J. D. Cardy, president, presiding.
 - Unfinished business. New business. Election of officers.
- 6:30 Informal banquet
 - Mrs. Oliver Uthus, Northwest District president, presiding.
 - Mrs. M. A. Gold, Butte, Montana, fourth vice-president, Woman's Auxiliary to the American Medical Association, honored guest and speaker.

TUESDAY, MAY 6, 1958

- 11:00 Brunch
 - Mrs. Samuel Shea, convention chairman, presiding.
 - Entertainment.
 - Installation of new officers by Mrs. M. A. Gold.
 - Post-Convention hoard meeting.

OFFICERS AND CHAIRMEN OF STANDING COMMITTEES, 1958-1959

State Officers

President—Mrs. V. J. Fischer, 303 8th Ave. S.E., Minot
 President-elect—Mrs. J. M. Van der Linde, 209 N.E. 3rd, Jamestown
 First vice-president—Mrs. R. F. Gilliland, 228 9th St. W., Dickinson
 Second vice-president—Mrs. R. W. McLean, Hillsboro
 Recording secretary—Mrs. J. W. Jansonius, 609 4th Ave. S.E., Jamestown
 Corresponding Secretary—Mrs. Darwin Kohl, 209 8th Ave. S.E., Minot
 Treasurer—Mrs. Carl Baumgartner, 615 N. Washington, Bismarck

State Committee Chairmen

Organization—Mrs. J. M. Van der Linde, 209 N.E. 3rd St., Jamestown
 Program—Mrs. R. F. Gilliland, 228 9th St. W., Dickinson
 Civil defense—Mrs. Ralph D. Weible, 1628 9th St. S., Fargo
 Nominating—Mrs. J. D. Cardy, 1110 Reeves Drive, Grand Forks
 Press and Publicity—Mrs. M. M. Heffron, (manager and chairman), 320 Ave. B West, Bismarck; Mrs. Robert Hankins (editor) Mott; and Mrs. C. A. Arneson, 714 N. 2nd St., Bismarck
 Public relations—Mrs. R. W. McLean, chairman, Hillsboro; and Mrs. L. T. Longmire, 810 6th St., Devils Lake
 Legislation—Mrs. Clyde Smith, 622 Raymond St., Bismarck
 Bulletin—Mrs. Andrew G. Sathe, 716 15th St. W., Williston
 Historian—Mrs. G. D. Gertson, 511 5th St. S., Grand Forks
 A.M.E.F.—Mrs. Lester Wold, 1708 S. 9th St., Fargo
 Parliamentarian—Mrs. E. L. Grinnell, 1207 Lincoln Drive, Grand Forks
 Mental health—Mrs. S. E. Shea, 808 1st St. S.E., Minot
 Recruitment—Mrs. John Young, 505 3rd Ave. S.E., Jamestown
 Rural health—Mrs. William Fox, Rugby
 Revisions—Mrs. Henry Kermott, Jr., 200 7th Ave. S.E., Minot
 Safety—Mrs. L. L. Hoopes, 118 9th Ave. S.E., Minot
 TODAY'S HEALTH—Mrs. Neville Turner, La Moure
 Resolutions—Mrs. L. T. Longmire, 810 6th St., Devils Lake
 Finance committee—Mrs. R. H. Waldschmidt, chairman, 600 N. Washington, Bismarck; Mrs. E. J. Larson, 321 2nd Ave. S.E., Jamestown; Mrs. Henry Kermott, Jr., 200 7th Ave. S.E., Minot; Mrs. Carl Baumgartner, 615 N. Washington, Bismarck; and Mrs. W. L. Macauley, 1410 S. 9th St., Fargo
 Medical Student Loan Fund—Mrs. B. A. Mazur (chairman), 1237 N. 3rd St., Fargo; Mrs. R. H. Waldschmidt, 600 N. Washington St., Bismarck; Mrs. J. A. Sandmeyer, 1005 Lanark, Grand Forks; Mrs. Gale R. Richardson, 12 10th St. S.W., Minot; and Mrs. John M. Keller, 910 4th Ave. E., Williston.

District Presidents, 1958-1959

First District—Mrs. B. A. Mazur, 1237 N. 3rd St., Fargo
 Southwest—Mrs. R. F. Raasch, 30 W. 8th St., Dickinson
 Sixth—Mrs. R. D. Schoregge, 1420 Ave. E East, Bismarck
 Northwest—Mrs. W. Kitto, 1021 Central Ave. West, Minot
 Devils Lake—Mrs. J. Terlecki, Minnewaukan
 Stutsman—Mrs. J. M. Miles, 722 6th Ave. S.E., Jamestown
 Grand Forks—Mrs. T. Q. Benson, 1524 Walnut St., Grand Forks
 Kotana—Mrs. John Keller, 910 4th Ave. East, Williston
 Traill-Steele—Mrs. R. W. McLean, Hillsboro
 Sheyenne Valley—Mrs. Neil MacDonald, 711 5th Ave. N.W., Valley City

District Councillors, 1958-1959

First District—Mrs. Douglas Lindsay, 1505 S. 11th St., Fargo
 Southwest—Mrs. R. W. Rodgers, 146 W. 6th St., Dickinson
 Sixth—Mrs. O. M. DeMouly, Flasher
 Northwest—Mrs. Henry Kermott, Jr., 200 7th Ave. S.E., Minot
 Devils Lake—Mrs. L. T. Longmire, 810 6th St., Devils Lake
 Stutsman—Mrs. G. H. Holt, 214 2nd Ave. N.E., Jamestown
 Grand Forks—Mrs. P. H. Woutat, 1205 Lincoln Drive, Grand Forks
 Kotana—Mrs. E. J. Hagen, 904 2nd Ave. East, Williston
 Traill-Steele—Mrs. Keith Vandergon, Portland
 Sheyenne Valley—Mrs. G. Christianson, 117 N.W. 3rd St., Valley City

Mrs. G. D. GERTSON, Historian

Motion was made by Mrs. Nierling that we recognize the deceased, through their past association in the organization, with the "In Memoriam" in the year they were deceased. Motion was seconded and carried.

It was stated that it was the councillor's duty in each district to send the necrology list to the state president.

Legislation Report

Happy indeed would be the nation's doctors if our United States congressmen were as cooperative as the North Dakota State legislators. During the 36th assembly of the North Dakota Legislature which ended recently, 50 bills were introduced with which the North Dakota State Medical Association was involved. Of the 12 which we supported, 10 were passed and 2 defeated. Of the 5 we opposed, 4 were defeated, and 1 was withdrawn. The remainder of the bills we merely followed with interest. Our efficient lobbyist, Mr. Lyle Limond, executive secretary of the North Dakota State Medical Association, is to be congratulated on this fine record.

Among the bills we supported were: HIB 533 appropriated \$50,252 for state Commission on Alcoholism; HIB 598 authorized counties and municipalities to provide ambulance service; SB 108 Children's Psychiatric Hospital. The bills which we opposed included: SB 100 authorized participation of licensed chiropractors in the Blue Shield plan; SB 118 osteopaths to be given full surgical and drug privileges. Action was favorable to the medical profession in all the above bills.

In Washington, the current legislative session is well underway. The Keogh-Simpson measure for tax deferral by the self-employed up to \$2,500 annually has been passed by the house and sent to the senate. There are rumors that the legislation might encounter stiff resistance due to the recent stand of the administration against the bill. The big question in the senate is whether backers will push for hearings this year or wait until next session when the budget issue may be more settled.

The Forand bill to provide hospitalization for O.A.S.I. recipients has been reintroduced. It is one of the most dangerous pieces of legislation submitted to congress in recent years. In the opinion of many, it would open the door to socialized medicine. It would boost the already skyrocketing social security taxes far beyond any level so far contemplated. Government medical plans are notorious for their tendency to grow and grow. Patients with imaginary ills rush for doctors and the hospitals because "it's free." Of course, it isn't free. The taxpayers have to pay directly in increased social security payments and indirectly in other taxes which go to meet deficits in government spending. The doctors, snowed under by people seeking "free medical treatment," can't give the proper attention to those who really need it. So the quality of medicine goes down and the quantity of taxes goes up.

It is wise to keep up with current legislation and an excellent way to do it is to read the A.M.A. News. This fine little paper has recently been published by the A.M.A. Remind your husband to bring it home regularly from the office. You will find many interesting and vital subjects very well covered.

Mrs. CLYDE SMITH, Legislation Chairman

Medical Student Loan Fund Report

During the past year, six loans were made, totaling \$3,000.

Currently, there are outstanding 29 loans for a total of \$13,502.16.

Before adding this year's district contributions to the Loan Fund, there remains \$892.45 in the cash account available for loans.

As of April 15, 1959, contributions from the districts for this year are as follows:

Grand Forks (rummage sale and dinner dance)	\$ 381.55
Stutsman (assessment)	135.00
Kotana	100.00
Northwest (assessment)	300.00

Southwest	50.00
Sixth (assessment)	600.00
First (supper dance)	200.00
Traill-Steele	21.00
Devils Lake	76.00
	<hr/>
	\$1,863.55

As of March 23, 1959, the total assets of the account are \$14,394.61. Adding our current contributions to the Loan Fund brings our total assets to \$16,258.16.

Mrs. B. A. MAZUR, Chairman

Mental Health

The Mental Health program for the Woman's Auxiliary has been outlined in three areas, namely: education, service, and legislation. Material for suggested activities from the Woman's Auxiliary to the American Medical Association and a conference with the chairman, Mental Health Committee of the North Dakota State Medical Association were the basis for the outlining of this program which was sent to each of the ten District Auxiliaries in the state.

In the area of *education*, it was suggested that programs be scheduled for auxiliary meetings that would educate members in principles of good mental health, problems of mental illness, juvenile problems, problems of the aging—also that films and articles in *Today's Health* be used and that trained personnel be engaged to speak.

At least 2 district auxiliaries have had mental health programs this year with speakers and discussion periods. In the field of *service*, it was recommended that we assist the mentally ill by volunteering services in institutions. A definite service project was outlined and urged for all district auxiliaries, namely, the contributions of materials for use in the Occupational Therapy Department of the State Hospital, Jamestown. The materials suggested were old nylon hose, costume jewelry, old pieces of fur, and cloth materials. At the time of this writing, 4 districts have reported that contributions of this type were collected and sent to the Jamestown Hospital.

In the field of *legislation*, we were urged to cooperate with other groups to promote legislation for the establishment of more facilities and increased appropriations for trained personnel.

GERTRUDE MARY SHEA, Chairman

Nominating Committee Report

Proposed slate for 1959-1960

President:

Mrs. John Van der Linde, Jamestown, 7th District

President-elect:

Mrs. R. W. McLean, Hillsboro, 10th District

First vice-president:

Mrs. L. T. Longuire, Devils Lake, 2nd District

Second vice-president:

Mrs. J. W. Jansonius, Jamestown, 7th District

Secretary:

Mrs. Clyde Smith, Bismarck, 6th District

Treasurer:

Mrs. Carl Baumgartner, Bismarck, 6th District

Mrs. J. D. CARDY, chairman

Mrs. J. SORKNESS

Mrs. HALLIDAY

Mrs. R. W. RODGERS

Mrs. Halliday and Mrs. Rodgers were alternates for Mrs. Swanson and Mrs. Gammell.

Motion was made by Mrs. Cardy that the chairman of the Nominating Committee obtain a list and keep a file, to be brought to the fall board meeting, of all past dis-

trict presidents, councillors, and state officers. Motion was seconded and carried.

Motion was made by Mrs. Cardy that the Nominating Committee meet at the fall board meeting and again prior to the convention. Motion was seconded and carried.

Press and Publicity Report

Four projects were completed by the Press and Publicity Committee during 1958-1959. They were:

1. The writing, editing, assembling, and mailing of 4 issues of *News, Views and Cues*.

2. Keeping an up-to-date mailing list of all North Dakota doctors' wives who are eligible for auxiliary membership and making mimeographed copies of the list according to districts. These copies were distributed to the state president, president-elect, treasurer, district officers, and councillors.

3. Assisting the state chairman of the A.A.P.S. contest by writing a news story about the contest which was suitable for use by all districts. Approximately 5 copies of the story were sent to each district president for distribution to the newspapers in her district.

4. Gathering reports from the districts not only for *News, Views and Cues* and the mailing list, but also for this report and a national report.

The *News, Views and Cues* this year, as in other years, included news from the districts about both personal and auxiliary activities, messages from state officers and chairmen, editorials, and personality sketches. All 4 issues were mimeographed.

The significant changes this year in the *News, Views and Cues* phase of our work were fourfold:

1. Our mailing list increased from 517 in April 1958 to 538 this April; only 58 went out of state, and expenses, consequently, increased as more paper, more address changes, and more postage were involved.

2. We increased our editorial staff to 4 members, namely, Mrs. R. E. Hankins, Mrs. C. A. Arneson, Mrs. J. W. Cleary, and myself. We shifted our duties around until we found the best working arrangement for ourselves. Mrs. Hankins started out this year as general editor, but, as it was difficult to procure all messages and news before the deadline, and last minute changes always cropped up, she suggested that to simplify procedures, the press and publicity chairman do the final editing, proofreading, and composing. Mrs. Arneson cut our stencils, including the commercial art tracings. Mrs. Cleary wrote many of the personality sketches.

3. Cutting our own stencils and adding a few illustrations was also an innovation this year.

4. The postal rates increased, necessitating an increase in the budget. The *News, Views and Cues* now costs approximately \$.09 per copy.

The material we read in our publication this year came to us through the cooperation of the many district correspondents, several state chairmen, the state president and president-elect, district presidents, councillors, and treasurer, all of whom furnished the editors with news, information and advice. Dean Harwood and Mr. George Michaelson (of the North Dakota Heart Association) were also contributors. Seven to 9 districts sent in reports for every issue, an average total of 9 to 12 district correspondents having gathered the news each time. One issue included material procured from 25 different sources.

At our 1958 convention, it was suggested by our district editor, and a motion was made, that each of the larger districts have a committee to assist the councillor gather news. Northwest, Stutsman, Southwest, First,

and Sixth Districts had the recommended committees this year. Mrs. P. H. Woutat alone did the news gathering in the Grand Forks District and news appeared in every issue.

In all of the 7 largest districts, where regular meetings and projects were a part of the program, newspaper publicity was received pursuant to district meetings and Student Loan Fund and Essay Contest projects. First District also publicized auxiliary activities and Paramedical Careers by sponsoring two films at the Science Fair. Stutsman District's medical wives have received radio and newspaper publicity for their wholehearted participation in community fund-raising and other work and for their Christmas Basket project. Southwest District also had TV programs as well as newspaper publicity in connection with their Future Nurses Club activities.

A summary and analysis of our Press and Publicity report would reveal that, although more people, more expense, and more work were involved in producing our official publication this year, the quality and appearance improved; and, with the addition to the committee of a business and circulation manager, the same quality and quantity of work could be produced more easily and smoothly. It would also show that 161 nonmember doctors' wives, in addition to editors of auxiliary News Letters in other states and our national officers, are receiving *News, Views and Cues*, and that the cost of including the nonmembers in our state is approximately \$57 per year. The analysis would also seem to indicate that Auxiliary activities are very well publicized in a few districts and moderately well publicized in many districts. Statewide, the total amount of publicity received this year appears to exceed last year's total. Finally, the increase in the number of names on our mailing list was not as large this year as it was last year.

Mrs. M. M. HEFFRON, chairman

Motion was made by Mrs. Longmire that we separate Publicity from the News Letter. Motion was seconded and carried.

Motion was made by Mrs. Heffron that the managing editor, coeditor, and business and circulation manager of our *News, Views and Cues* be added to the Board of Directors. Motion was seconded and carried.

Motion was made by Mrs. Cardy that the number of issues and distribution be left to the discretion of the editor. The motion was seconded and carried.

State Recruitment

About half of this year has been spent in organizing a mimeographed list of loans, grants, and scholarships which are available throughout the state of North Dakota to young people who wish to enter para-medical fields. Literature has been sent out over the state, with more on the way.

The three Future Nurses Clubs in the state are functioning just beautifully and I sincerely hope that more of our districts will take the cue and perhaps start a club of their own in that district. We have been more than please and gratified not only with the number of young women who began their training last fall, but also the number that have been accepted or are awaiting acceptance this fall into the various allied medical careers of their choice. Most are choosing nursing careers but some girls are becoming more aware of and acquainted with other interesting and opportune fields as well. Trips to various hospitals and lectures hold a good deal of interest for the members. The selling of *Today's Health* has also been instituted in one club. Making favors for various institutions provides for much social fun and satisfying achievement.

Two recommendations come to my mind regarding future planning. During a girl's senior year there are so many activities connected with dances, graduation, and various preparations for leaving school that one wonders if it wouldn't be wiser to concentrate the major portion of interest on the sophomore and junior classes. The other recommendation is that I feel the schools should be encouraged to endorse the Future Nurse's Clubs as a part of their club curriculum and in this way I feel sure that we would be able to increase the membership by quite a number.

If at any time anyone has suggestions or recommendations, they would be very sincerely appreciated.

I have so enjoyed this year and because of it have met so many wonderful people. It's nice to be a part of this Auxiliary and its programming.

JUNE G. YOUNG, Chairman

Mrs. Mackersie thought it wise to get the younger students interested in the allied medical fields; then, they could make a wiser choice of courses to guide them.

Mrs. Van der Linde asked that each district make a request for the desired number of copies of the "Scholarship Report."

Revisions Committee

The Constitution and Bylaws of the Woman's Auxiliary to the North Dakota Medical Association was revised. We followed the pattern set by the Woman's Auxiliary to the A.M.A. and combined and streamlined the Articles of the Constitution and Bylaws. The finished product we have called Bylaws.

The proposed Bylaws were presented to the Board of Directors of the auxiliary at the 1958 fall board meeting and they were approved by this board. A copy of the proposed Bylaws was sent to the executive secretary of the North Dakota State Medical Association and was published in the April issue of *News, Views and Cues*. The Bylaws were discussed again at the pre-convention board meeting and the Board of Directors recommended a few changes.

The revised Bylaws will be presented to the Convention with the recommendation that they be adopted.

Mrs. HENRY KERMOTT, Chairman

Mrs. V. J. FISCHER, president,
Woman's Auxiliary to the North
Dakota State Medical Association

Rural Health Committee

I contacted the 10 districts and received a reply from 8 of them. None of the districts that reported had done any work in behalf of rural health during the past year.

I did not receive any information, material, or program from National in this regard.

Mrs. W. R. Fox, Chairman

Safety

At the recommendation of the Board at our state board meeting in September, a letter was sent to the Ford Conference on Safety, held at Dearborn, Michigan, urging manufacturers to include safety features such as padded dashboards and safety belts as standard equipment on all automobiles.

At the Northwest District's April meeting, the safety chairman displayed the posters "Testing the Drunken Driver" and gave the group a quiz from the A.M.A. pamphlet, "Test Your A.Q." One of their physicians spoke on chemical tests for alcohol and their legal status in North Dakota. The article, "Americans Don't Want Traffic Safety," was read and discussed with a definite purpose. Members were asked to consider a possible program for next year: each member would submit to a

safe driving checkup sometime during the year. Publicity would be issued in conjunction with this program to arouse local interest in safe driving.

It is my impression that material coming in from national after the districts have laid their year's programs tends to remain in files. It is important to have concrete, attractive materials on hand at our Fall Board meetings; slides, posters, exhibits, even gimmicks such as were reported to us by our state president from the National Convention, make an impression.

Other organizations, such as the National Federation of Women's Clubs, are also sponsoring Safety. We might do well to join forces, where possible, and increase the strength of our local safety programs.

MRS. DOROTHY T. HOOPES, Chairman

Today's Health

We are very proud of the record which our state has attained in the *Today's Health* subscription contest this year. We surpassed our quota well over one hundred per cent, which is the best record we have had in a number of years. I believe that this is due to the constant effort of all members to publicize the magazine, and to the work of some very diligent district chairmen and presidents. The enthusiasm of lay subscribers, as well, promoted sales considerably.

Reports from most district chairmen denote that nearly every Auxiliary member was contacted this year. One district obtained a film strip on the magazine from the Chicago office. Other districts gave gift subscriptions, and some sent reminders to former subscribers. Nearly every district had *Today's Health* on display at each meeting, either in the form of posters, or the magazine itself. All those factors have enabled us to be one of the six states to exceed 100 per cent quota.

We are indeed grateful to the North Dakota Medical Association which gave 168 subscriptions to all legislators. The credits received here were a tremendous addition for us.

The statistics, compiled by the Chicago office, include subscriptions received from the start of the contest through March 19, 1959. Many districts have made additional sales since this date and subsequently earned more credits. However, since all district reports have not yet been received, the following gives a more complete record for comparative reasons:

County	Quota	Credits	Percentage
Cass (First district)	68	8	12
Cheyenne Valley	—	—	—
Devils Lake (Second district)	16	14	87
Grand Forks district	50	15	30
Kotana	18	21	117
6th District (Burligh)	59	64	108
Northwest district	34	36	106
Southwest district	25	15	60
Stutsman	24	38	158
Traill-Steele	8	—	—
State	—	168	—
State quota, 302			
Total credits, 404			
State percentage (March 19), 134 per cent			

We were third high in the nation. Congratulations to all those districts who exceeded their quota!

Recommendations for the coming year:

- Urge members to give more gift subscriptions
- Increase our contact with non-Auxiliary members
- Use of roll call of articles from magazine at meetings
- Reminder letters before subscriptions expire
- Letters to members-at-large and dentists, with a blank subscription form enclosed

Let's keep up the good work that has been done so far in the coming year.

MARIAN E. TURNER, Chairman

Motion was made by Mrs. Rodgers that the Standing Committee Reports be accepted. Motion was seconded and carried.

Resolution Report

1. *Be it resolved:* That this convention of the Woman's Auxiliary to the North Dakota State Medical Association extend to Mrs. V. J. Fischer its sincere thanks and appreciation for the great service which she has rendered to that group in the past year.

2. *Be it resolved:* That the Woman's Auxiliary to the North Dakota State Medical Association express grateful appreciation and thanks to the city of Bismarck; to the Medical Society of the Sixth district; to the Auxiliary convention chairmen; to managers and staffs of the hotels; to members of the press, radio, and television; to Mr. Lyle Limond, executive secretary to the North Dakota State Medical Association, and his staff; to Dr. O. A. Sedlak, past president; to Mrs. William G. Mackersie, of Detroit, Michigan, North Central Regional Vice-President of the Woman's Auxiliary to the American Medical Association; and to all other persons and groups who have contributed to the success of the convention and to the comfort and entertainment of the delegates.

3. *Be it resolved:* That the Woman's Auxiliary to the North Dakota State Medical Association express appreciation for the support and cooperation received from all persons, organizations, and agencies who contributed to the success of its program and that of its state and district auxiliaries during the past year.

MRS. THOMAS LONGMIRE, Chairman

Mrs. Longmire moved the adoption of the Resolution Report. Motion was seconded and carried.

The following District Reports were then given:

Auxiliary President's Report—First District

The First District Medical Auxiliary held 4 meetings this year, consisting of 3 luncheons and 1 dinner meeting. The first meeting, October 29, 1958, was a luncheon meeting at the Rex Cafe. Mr. Don Eagles, Executive Director of Blue Shield in North Dakota, spoke about Blue Shield. The second meeting was a dinner meeting on February 24, 1959, at the Gardner Hotel, with no planned program, the time being given to committee reports and business. The third meeting was a luncheon meeting on March 31, 1959, in the Frederick-Martin Hotel. Our state president, Mrs. V. J. Fischer, was our honored guest and speaker. Mrs. R. W. McLean of Hillsboro, our president of Traill-Steel District and second vice-president of the State Auxiliary, was also a guest. Our fourth meeting was a luncheon meeting on Wednesday, April 29, at the Rex Cafe. Mr. John Caticchio spoke on Mental Health. The new officers for the coming year were elected.

This year, following revision of the National and State Bylaws, First District adopted a new set of Bylaws, drawn up by our chairman of Constitution, Mrs. Stephen Bacheller, after consultation with the Executive Board.

We instituted printed yearbooks for the first time, which list our meetings for the year, our current officers, past president, chairmen of standing committees, and a list of members with their addresses and phone numbers.

A change in dues was initiated; dues of \$15 now cover national, state and local dues, and the cost of meals served at the four meetings.

For the first time we have an Advisory Council of 3 members from the First District Medical Society.

A new fund-raising project, a successful Valentine Theme Benefit Supper Dance for 200 people, was held

February 7, 1959, in the Top of the Mart, with Mrs. George Thompson and Mrs. W. O. Webster as co-chairmen of the Project committee. Profits realized benefited the Medical Student Loan Fund and the A.M.E.F. This replaced our annual Dessert Style Show.

In addition to our contribution to the A.M.E.F. from the money raised by our Supper Dance, First District sold \$183 worth of the Special A.M.E.F. Christmas cards.

At the local High School Science Fair, we sponsored the career recruitment film, "Helping Hands for Julie," with the showing of two additional short science films. Seven shows were given. Teenage daughters of auxiliary members, working in pairs, were present at all showings to distribute career literature.

As part of our mental health program, members volunteered to contribute refreshments of ice cream and cake or cookies to the twice monthly meetings of the Senior Citizens group at the Y.W.C.A. We also collected old hose, jewelry, fur, and material for occupational therapy work at Jamestown Hospital.

For Career Day at the high school, our Committee on Paramedical Careers, with Mrs. H. A. Norum as chairman, worked with personnel of the nursing schools of the hospitals to present careers in nursing to juniors and seniors in the high school. Later in the week, a tea was given to girls interested in nursing careers, with the showing of a pertinent film, followed by tours of the hospital.

Again we participated in the AAPS Essay Contest, with the help of financial support given by the First District Medical Society. In spite of the able promotions of our chairman, Mrs. T. L. Donat, the response was poor. Two prizes were awarded. One of our winners placed third in the state contest.

Many of our auxiliary served the community as members of the school board, boards of several P.T.A.'s, board of the Y.W.C.A., the Volunteer Service Bureau, the Junior Service League, the Woman's Association of the Fargo-Moorhead Symphony, and the Fargo Family Service Association. Other members gave volunteer work to the above associations as well as the Fargo-Moorhead Opportunity School, the Red Cross, the Tuberculosis Association, Children's Village, United Fund, the Cancer Society, Mental Health Association, and auxiliaries of local hospitals. We are proud of the contribution that the First District Medical Auxiliary, with its 66 members, has made in serving our community.

Our officers for the past year were

Mrs. M. H. Poindexter, vice-president; Mrs. Robert J. Ulmer, secretary; Mrs. G. U. Ivers, treasurer; and Mrs. D. T. Lindsay, counselor.

MRS. B. A. MAZUR, President

Auxiliary President's Report—Second District

The Devils Lake Medical Auxiliary enjoyed entertaining our state president, Mrs. V. J. Fischer, at the March meeting, a privilege most appreciated by all.

We had an increase in membership. We now have 19 members. We sent in 19 subscriptions to the *Bulletin*, and a substantial increase in subscriptions to *Today's Health*. We had 8 meetings.

Forty-eight dollars was realized from the sale of Christmas Cards for the benefit of the A.M.E.F.

Seventy-six dollars was sent to the Student Loan Fund. In memory of Mrs. W. F. Sihler, the Auxiliary gave a \$5 memorial to the A.M.E.F.

Mrs. L. T. Longmire, Devils Lake, reported that 7 entries were received to the Essay Contest, 3 of which were entered in the State Essay contest.

MRS. J. TERLECKI, President

Auxiliary President's Report—Third District

We of the Grand Forks District Medical Auxiliary feel that we have had a very successful year.

A new format has been tried as to the time of meetings, with two evening dessert meetings instead of the usual dinner meetings. This seemed to find favor, especially among the young mothers in our group. Our January and March meetings were dinner meetings, as in previous years.

The programs were stimulating. In the October meeting in the lounge at St. Michael's Hospital, our guest was a local attorney who spoke on "City Government," an issue at that time. In November, at the Grand Forks Clinic Lounge, and in March, at the Ryan Hotel, we had medical discussions. Dr. Philip Andrews spoke on Mental Health, and Dr. Wallace W. Nelson showed a cancer detection film, "Time and Two Women" (supplied by the North Dakota Cancer Society). One of our members, Mrs. Donald Miller, sang a group of operatic selections. At the January meeting, we were delighted to have our state president, Mrs. V. J. Fischer, as our guest, and as our guest speaker. The same evening, Mrs. Robert Folsom, a non-member, played a group of piano numbers.

The project committee worked with enthusiasm. A rummage sale in the fall netted \$78.50, a most enjoyable dinner dance on March 14th gave us \$298.05 more, building our contribution to the Student Loan Fund for the year to \$376.55.

As many members had already arranged for their Christmas cards before the A.M.E.F. cards were received, sales for this project netted only \$78. Memorial contributions to the A.M.E.F., however, amounted to \$125, making a total contribution to date of \$203. Our *Today's Health* chairman reported 23 subscriptions received. The *Bulletin* received only 6.

Our sponsorship of the Student A.M.A. Wives has continued. Their members were our guests at our October meeting; we were their guests at their April meeting. Auxiliary women continue to open their homes for one S.A.M.A. meeting monthly. Affiliation with the national organization took place during the year.

Auxiliary members served as hostesses when the Rehabilitation Center at the University had its formal Open House in October. We were informed of available scholarships and urged to make this information available to needy students.

Our membership roster shows 57 local members, 27 out-of-town members. A sincere effort was made to contact new members and to bring them to our meetings.

The Grand Forks Community was saddened by the death of Mrs. Robert D. Campbell, at the age of 88, on January 23, 1959. She was a most gracious person, charming and dignified, who enriched the lives of all who knew her. Dr. and Mrs. Campbell have made many generous contributions to the Medical School at the University of North Dakota.

Officers elected for the year 1959-60 are:

Mrs. E. A. Haunz, president; Mrs. R. E. Mahowald, vice-president; Mrs. Nelson Youngs, secretary; Mrs. Louis Silverman, treasurer.

MRS. T. Q. BENSON, President

Auxiliary President's Report—Fourth District

The Northwest District has 30 members this year, plus 2 honorary members. As in previous years, we have used the "package deal" of \$10 to cover local, state, and national dues besides including our subscriptions to *Today's Health* and the *Bulletin*.

We will have had 5 regular meetings, 4 dinner meetings, and 1 luncheon by the close of the business year.

At our meeting on April 23, we will have election of officers, a program of both civil defense and safety, and the final reading and passage of our newly-reworked bylaws. The tremendous job of re-doing the bylaws has been accomplished by Ruth Fischer and Marjorie Kermott, and we are much indebted to them for their time and effort.

At the first meeting of the year in September, we voted to disband our "Paper in a Poke" efforts, at least temporarily, and assess ourselves \$10 each for Student Loan this year. We now have \$260 for our contribution, and hope to reach \$300 without much trouble. Admittedly, this was the easy way out, and most of us have missed the flurry of packaging and peddling the brown paper bags.

The state-sponsored Christmas card project was ably handled by Mrs. Paul Breslich. The cards did not arrive in time to be distributed at our meeting in October, but with a little telephoning and much delivering we easily sold our quota and made our contribution to A.M.E.F. At the October dinner meeting our state president, Ruth Fischer, gave us the highlights of the national convention in San Francisco, and a delightful skit was given by several of the members concerning the history and development of our Northwest Auxiliary and its projects and work.

The January meeting, a luncheon, was highlighted by a travelogue given by Mrs. Richard Adams of Minot, who had spent several years living in Japan. She brought many delightful tales of the customs and character of the Japanese as well as many beautiful pieces of clothing, bowls, and other mementos.

Since early September, Mrs. Kenneth Amstutz, our Essay Contest Chairman, has been stirring up interest in the various high schools in our district. This year, we did have entries and we awarded a first prize of \$25, second of \$15, and third of \$10. One of our winners, Ellis Hegeseth, we have just been informed, has taken first in the state contest. We have yet to hear his essay, but at our March meeting we heard the other two very fine essays, and entertained the three winners at dinner. We are very grateful to the Northwest Medical Society for a gift of \$25 for prizes for the contest.

Members of our auxiliary have served the St. Joseph Hospital Guild, and this month will serve at Trinity Hospital. A new cart, loaded with patient needs, has been started at Trinity. Some of our members have been instrumental in getting this project under way. Other community activities have been aided and abetted, as usual, by our Auxiliary members.

My thanks to all of the officers and chairmen for making this year such a pleasant one to have served as president.

MRS. WILLIAM KITTO, President

Auxiliary President's Report—Sixth District

The Sixth District Medical Auxiliary held 4 regular dinner meetings.

The program consisted of:

1. A speech by Dr. Olou Garderbring, director of Social Services for the State Welfare Department, on the need for a psychiatric children's hospital in North Dakota.
2. A travelogue, presented by Mrs. Kenneth Johnson, of their summer trip to Alaska.
3. A film on atomic fallout shown by Lt. Col. Robert Millen, who is in charge of Civil Defense in Bismarck.
4. A talk by Mr. Lyle Limond, executive secretary of the North Dakota State Medical Association, on medical legislation during the 1959 session. The election of officers for the coming year was also held during this meeting.

The Sixth District Medical Auxiliary has a current membership of 59 members.

We were pleased to have as our guest at our January meeting the state president, Mrs. V. J. Fischer, who stressed the aims of the auxiliary through a pantomime skit.

The sale of Christmas cards for the A.M.E.F. proved to be quite a successful project. The sum total from our district was \$135.

Individual donations to the Student Loan Fund were made, rather than the undertaking of a project for raising the funds. A check was sent in for \$600.

Through Mrs. C. H. Peters' efforts, our *Today's Health* subscriptions have put us on record. Fifty-nine subscriptions have been sold, plus 15 credits for extra years. We feel this has been a satisfying achievement. North Dakota ranks third in the nation's rating.

Several of our members attended some of the committee hearings concerning medical legislation which we felt were important to our state and community welfare. Their action in this respect is most commendable. We have many members who are active in various community and hospital activities. It makes one proud to be a member of such a group.

I wish to thank the members of the Sixth District for their interest, and kind assistance during the past year.

MRS. ROBERT SCHOREGGE, President

Auxiliary President's Report—Seventh District

The Stutsman County Medical Auxiliary began its year's activities in September by serving a coffee hour at the Annual Conference of the Easter Seal Society.

Our first meeting, a luncheon, was held in October, and we were pleased to have three out-of-town members present. Mrs. John Van der Linde reported on the highlights of the National Conference which she had attended in Chicago. The A.M.E.F. Christmas card project was presented and our quota was sold.

We were very pleased to have Ruth Fischer, our state president, attend our Christmas tea at the home of Mrs. Robert Woodward. As in previous years, members donated food, clothing, and toys to two needy families in the area.

Our Future Nurses Club continues to be very active. Mrs. John Beall, Mrs. John Elsworth, and Mrs. Ed Hieb have served as advisors this year.

In February, we met for a dinner meeting and decided to sponsor again a birthday party for the patients at the State Hospital in July. We will plan for this and elect officers at a luncheon meeting on April 28.

We contributed \$135 to the Student Loan Fund, but our biggest accomplishment this year has been to boost our *Today's Health* subscription rate from 38 per cent of our quota last year to about 200 per cent this year. Mrs. George Holt was our chairman again this year and is to be commended.

MRS. JAMES V. MILES, President

Auxiliary President's Report—Eighth District

Since the last State Medical meeting, the Kotana District has met twice. We had a luncheon meeting in November and a dinner meeting in December, at which time we hoped to have election of officers. We were short a quorum at both meetings.

Our members are very cooperative as far as dues and donations are concerned. We donated \$100 this year to the Medical Student Loan Fund. We also contributed \$10 to the American Educational Foundation and purchased the Christmas cards sent us.

MRS. JOHN KELLER, President

Auxiliary President's Report— Traill-Steele District

The Traill-Steele District Medical Auxiliary, with a membership of nine, meets four times a year, and functions as a social group. Each member is active in civic affairs, and although we are unable to carry out major Auxiliary projects, we have been able to contribute to A.M.E.F., Student Loan Fund, take part in community services, and work toward mental health education.

We had the wholehearted support of the district members concerning the A.A.P.S. essay contest, and a lot of work was done to promote interest in it in the schools of our area. Unfortunately, our efforts were quite fruitless.

Election of officers was held at our late winter meeting. The new officers for 1959-1960 are:

Mrs. D. N. Mergens, Hillsboro, president; Mrs. H. A. LaFleur, Mayville, vice-president; and Mrs. James Little, Mayville, secretary-treasurer.

MRS. R. W. McLEAN, President

Auxiliary President's Report—Tenth District

The Woman's Auxiliary to the Southwestern District Medical Association of North Dakota held 5 dinner meetings during the year 1958-1959.

The first meeting, June 14, was a joint meeting of the Medical Society and its Auxiliary which was held at the Hankins Clinic in Mott, with participants as guests of Dr. and Mrs. Robert Hankins and Dr. and Mrs. William Buckingham. A short business meeting followed the dinner. Mrs. Amos Gilsdorf, nurse recruitment chairman, reported that the tea given for the Future Nurses Club of St. Joseph's Hospital, Dickinson, on May 23, was very much appreciated. A motion was made and carried that the expenses for the tea (\$8) be allowed.

On September 7 and 8 the members of the Auxiliary worked as volunteers for the blood-typing clinic held in Dickinson at the Community Building.

The October meeting was held at the home of Mrs. Harlan Larsen. Motions were made and carried that the Auxiliary support the A.A.P.S. essay contest again this year and that the members also buy Christmas cards in support of the A.M.E.F. fund.

Ways were discussed for increasing our *Today's Health* subscriptions. Mrs. Donald Reichert suggested that each Auxiliary member send a gift subscription of *Today's Health* to a relative or friend.

Mrs. Gilsdorf, nurse recruitment chairman, reported that the Future Nurses Club had installed their new officers at a candlelight service in August. She also reported that the advisors and she had met with the officers of the club and had planned the year's program. Mrs. Gilsdorf also reported that Mrs. Fern Knap, florist, gave a demonstration and lecture to the girls on flower arrangement.

Volunteers were asked to help take the members of the club to Bismarck on a field trip.

On December 13, the auxiliary members of Dickinson held an afternoon coffee for the out-of-town members at the home of their president, Mrs. Richard Raasch. A short business meeting was held, during which the judges were picked for the essay contest. They were: Mrs. Paul Weir, Miss Gertrude Voldal, and Dr. Robert Gilliland. Mrs. Raasch announced that essays had been distributed to the following high schools: Richardton, Beach, Mott, Elgin, New England, Bowman, Regent, Central and Model in Dickinson, and also to the members of the Future Nurses Club.

On the evening of December 13, the members of the

medical society treated the members of the Auxiliary to a dinner and a dance.

The February meeting was held at the home of Mrs. Robert Gilliland. Mrs. Gilliland, state program chairman, stressed the importance of having a local committee chairman to correspond with the state chairman whenever possible. The president recommended that the incoming president appoint the necessary chairman to correspond with this suggestion for the coming year.

Mrs. Chris Dukart, A.A.P.S. essay chairman, asked that the out-of-town members remind their school principals that the entries for the contest should be sent to her before March 1. The President announced that about 50 essays had been given out in the Southwest District this year and there seemed to be much more enthusiasm and interest than last year.

A letter was read from Mrs. A. A. Curiskis, Elgin, asking that her name be removed from the Southwest District Auxiliary membership list.

A motion was made and seconded that Mrs. Gilsdorf and Mrs. Raasch be thanked for their excellent work and help in behalf of the Future Nurses Club. It was announced that Mrs. Raasch had trained the girls during the Christmas vacation for their volunteer duties at the hospital.

Mrs. Gilsdorf, recruitment chairman, reported that she and Dr. Gilsdorf had taken the Club on a field trip to Bismarck to visit the Bismarck hospitals and also the Richardton Memorial Hospital in Richardton. Mrs. Gilsdorf also reported the following activities of the Club:

The girls had fixed "trick-or-treat" baskets for the patients at the hospital and distributed them on Halloween.

In November, the club members had assisted with the medical section of Career Days at the high school and the Club had also viewed two films illustrating the medical profession. The members of the club also decorated the trays for the patients who remained in the hospital over Thanksgiving.

In December, the club members decorated the Pediatric Department at the hospital for the Christmas holidays and held a bake sale on December 23. Mrs. Gilsdorf thanked the Auxiliary members for contributing their support. In January the Club viewed two films on allied medical careers, and Mrs. Geo. Braun of Dickinson spoke to them on the scholarship possibilities available for them in the Women's Benefit Association.

Mrs. Robert Thom expressed a desire to start a Future Nurses Club in Bowman, North Dakota. The necessary information was sent to her from the club in Dickinson.

The president appointed a nominating committee to pick a slate of officers for the coming year. They are: Mrs. Robert Gilliland, Mrs. C. R. Dukart, and Mrs. Harlan Larsen.

The April meeting was held at the home of Mrs. Richard Raasch with Mrs. V. J. Fischer, state president, as guest.

Mrs. Gumper, A.M.E.F. chairman, reported that she had sold \$51 worth of Christmas cards and had sent the money to the A.M.E.F. fund. After some discussion the Southwest Medical Auxiliary voted to continue the sale of cards to promote this fund.

In the absence of *Today's Health* chairman, Mrs. Raasch reported that the Southwest District was credited with 25 subscriptions to this magazine.

Mrs. C. R. Dukart, A.A.P.S. essay chairman, reported that there were 19 entries in the essay contest this year. They were as follows: Beach, 13, Mott, 3, Dickinson, 2, Richardton, 1. The winners were as follows: first prize (\$15), Miss Lorlie Mayer, St. Mary's School, Richardton;

second price (\$10), Miss Marie Hoff, St. Mary's School, New England; and third prize (\$5), Miss Judith Nichols, Beach.

Checks were sent to the winners by the A.A.P.S. chairman. The secretary, Mrs. Rodgers, was instructed to send notes of thanks to the judges. Mrs. Robert Gilliland stated that the Southwest District had the most entries in the essay contest this year and that we should be very proud of our chairman and her efforts.

The following recommendations were made in regard to the essay contest:

1. That each school outside of Dickinson judge its own essays before sending them on to Dickinson to be judged for the state contest. This was done to cut down on the amount of reading the judges would be required to do.

2. That the dates for judging on the local level be changed so that the judges may have more time before sending the essays to the state contest.

3. That the Auxiliary ask the medical society for \$50 instead of \$25 for the prizes next year.

Motions were made and carried that we send \$50 to the Student Loan Fund, and \$50 to the A.M.E.F. fund.

Mrs. Gilsdorf, nurse recruitment chairman, reported that in March three professional nurses had spoken to the Future Nurses Club on the different opportunities found in the nursing profession and that the club had furnished Easter decorations for the children's ward at the hospital on Easter. Mrs. Gilsdorf also reported that two field trips were planned for April, and that a Medical Career Week was planned by the Club, including a TV program and movie titled, "Helping Hands for Julie." In May, a film on mental health is to be shown, followed by a lecture on psychology given by Dr. Dungan of Dickinson State Teacher's College.

Mrs. Robert Hankins reported a very active Future Nurses Club of 13 members at Mott. All medical careers are incorporated into this group. Mrs. Hankins also expressed a desire to bring her group to Dickinson and have them take part in the tea and pinning ceremony with the group in Dickinson.

A motion was made and carried that the Auxiliary again sponsor the Future Nurses Club for the coming year and that the Auxiliary give a tea for the members of the club when they receive their pins in May, the time of the tea and its arrangements to be made later by Mrs. Gilsdorf.

A report of the nomination committee was as follows:

Mrs. Richard Raasch, president; Mrs. Robert Hankins, vice-president; and Mrs. Norman Ordahl, secretary-treasurer.

A motion was made and carried that this slate of officers be accepted. Delegates to the State Convention:

Mrs. Raasch and Mrs. Hankins; alternates, Mrs. Gilsdorf and Mrs. Gilliland.

Following the business meeting, Mrs. V. J. Fischer, State Auxiliary president, spoke to the Auxiliary briefly on the various projects and their importance to the medical profession as a whole. She mentioned that not all district auxiliaries were able to appoint chairmen for all projects adopted by the state, but they should assign local chairmen to as many as possible. The most important, she felt, were:

1. The Student Loan Fund, which was instituted by the auxiliary in 1951 to make loans available to third and fourth year students.

2. The A.M.E.F., because of its importance to the A.M.A. and the medical schools.

3. *Today's Health* magazine, the official publication of the A.M.A., which gives authentic information to lay readers concerning many medical fields.

4. Legislation: concentrated auxiliary action could make a considerable show in important medical legislation.

Mrs. Fischer also stated that she was very impressed with our local nurse recruitment program.

Mrs. Lawrence Reichert is councillor for the Southwest District; Mrs. Robert Hankins, Mott, is editor for *News, Views and Cues*—North Dakota's newsletter. Mrs. Robert Gilliland is State Program Chairman.

During the year, letters were sent to all potential members of the Southwest Medical Auxiliary who do not belong at this time. We received one additional membership. At the present time, there are 26 members—an increase of 1 over last year.

The financial report made by Mrs. Rodgers, secretary-treasurer, listed dues paid to national and state associations, \$104, American Medical Education Fund, \$50, Student Loan Fund, \$50.

The following committees were appointed by the President:

Program—Mrs. Robert Hankins

Civil defense safety—Mrs. Wm. Buckingham

Nurse recruitment—Mrs. Amos Gilsdorf

A.M.E.F. Student Loan Fund—Mrs. R. Rodgers

Today's Health—Mrs. Robert Gilliland

State councillor, Bulletin—Mrs. Lawrence Reichert

Public relations—Mrs. Donald Reichert

Press, Publicity and A.A.P.S. essay contest—Mrs. Harlan Larsen

Rural and mental health—Mrs. Robert Thom

Legislation—Mrs. Henry Slominski

Mrs. RICHARD RAASCH, President

Motion was made by Mrs. Benson that the district reports be accepted. Motion was carried.

Under new business, delegates were elected to the A.M.A. to be held in Atlantic City, June 8 to 12. Mrs. Nierling nominated Mrs. G. H. Holt, Jamestown. Mrs. Schoregge nominated Mrs. C. H. Peters, Bismarck, alternate. Mrs. Neville Turner moved that nominations close. Motion carried and the above two were unanimously elected.

Motion was made by Mrs. Rodgers that we recess for lunch.

A delightful luncheon was held at the Apple Creek Country Club, Monday, May 4, with Mrs. Dahl presiding. Mrs. Dahl introduced Mrs. Waldschmidt, Convention Chairman, and the following past state presidents: Mrs. C. A. Arneson; Mrs. J. D. Cardy; Mrs. E. T. Keller; Mrs. L. H. Kermott, Jr.; and Mrs. R. W. Rodgers.

Mrs. J. M. Van der Linde introduced Dr. J. C. Fawcett, president-elect, Devils Lake. Dr. Fawcett mentioned that his attitude had been a highly critical one when the auxiliary was first organized. He thought that the last male stronghold had been infiltrated. However, he was happy to state that with our achievements his attitude had rapidly changed. He praised us for our outstanding Medical Student Loan Fund and said that it had made for a better liaison between students and the Medical Association. He praised our organizing the Medical Student Wives Club. He stated that the medical association could use a little more participation from the auxiliary in the A.M.E.F., in public relations, and in further participation in legislation problems, and asked that we keep up our dedicated work.

A lovely style show, with fashions from Robertson's, was staged with Mrs. Clyde Smith reading an introductory poem and introducing the narrator, Mrs. Lyle Limond.

Mrs. C. H. Peters played organ selections during the style show.

Mrs. L. L. Hoopes, Minot, presented Mrs. V. J. Fischer a gift from the Fourth District.

The second business session reconvened at the Apple Creek Country Club, Monday, May 4, 1959, 2:30 P.M. Mrs. V. J. Fischer, president, called the meeting to order.

Mrs. J. D. Cardy, Chairman, Nominating Committee, presented the following slate of officers:

Mrs. R. W. McLean, president-elect; Mrs. L. T. Longmire, first vice-president; Mrs. J. W. Jansonius, second vice-president; Mrs. Clyde Smith, recording secretary; Mrs. Carl Baumgartner, treasurer; and Mrs. R. L. McFadden, corresponding secretary.

Mrs. Fischer asked for nominations from the floor for each of the above offices. Since there were none, the Secretary was asked to cast a unanimous ballot for the slate of officers.

Mrs. Schoregge reported that the Auditing Committee (Mrs. Schoregge, Mrs. Benson, and Mrs. Mazur) had audited the books and found them correct and in order.

Motion was made by Mrs. Kermott that we substitute the new Bylaws prepared by the Revisions Committee for the old Constitution and Bylaws. Motion was seconded and carried.

An informal banquet was held Monday, May 4, 6:30 P.M., at the Bismarck Municipal Country Club, with Mrs. R. D. Schoregge, Sixth District President, presiding. The program was delightful with piano selections by Dr. Kling, Choralaires from St. Mary's High School, and a ballet number.

Mrs. William Mackersie, Detroit, Michigan, Regional Vice-President of the Auxiliary to the A.M.A., was our honored guest and speaker. She chose as her theme, "Wheels of Progress." She started her address by saying, "Our eyes are placed in the front of our head because it is more important to look ahead than behind." If you wish to know the road ahead, ask those who have traveled it. She mentioned our organization date, May 26, 1947, and stated that on that same day in 1922, the Woman's Auxiliary was organized in St. Louis, Missouri, with only 24 women attending. We now have 51 organized auxiliaries and an organization 75,000 strong. She stated the Auxiliary was a cohesive force in cementing friendships and that since its inception it had become a public service organization. In 1931, a resolution was adopted by the A.M.A. to stimulate interest in their publication *Hygeia* (now *Today's Health*). In 1945, they began alerting members on medical legislation. She stated that it was up to us to know the legislation and to do something about it. In 1943, Nurse Recruitment (now Paramedical Careers) was added to our committees. In 1951, Civil Defense was added at a national, state and county level. She thought the A.M.E.F. one of our best public relations programs along with our Student Loan Fund. She thought safety should be very high on our priority list. She quoted some very startling statistics in highway deaths—37,000 people killed in traffic accidents last year. The theme for the year was "Check your driving and check accidents."

She stressed the far reaching importance of our rendering assistance to the S.A.M.A. organization.

She stated the hub of the "wheels of progress" was the elected officers; the spokes were the committees—the cohesive power to the wheel; the smaller auxiliaries—the rim of the wheel. She mentioned two kinds of people: those who lift and those who lean (for every lifter, there are fifty who lean). She stated that we should continue down the highway of service. "Your ladder of service is waiting for you to use it." She ended her address by saying, "A task without a vision is a drudgery; a vision without a task is a dream; in the vision you see the task and the victory."

Mrs. Mackersie was presented with a gift from the Auxiliary.

A very lovely brunch was held in the Princess Room, Prince Hotel, Thursday, May 5, 10:30 A.M., with Mrs. R. H. Waldschmidt, Convention Chairman, presiding. Dr. O. A. Sedlak, president, North Dakota State Medical Association, was introduced. He praised our services to the State Medical Association.

Mrs. Waldschmidt reported 101 registrants—a record for any North Dakota State Medical convention.

She then introduced Mrs. Lund, wife of the first vice-president; Mrs. Fawcett, wife of the president-elect; Mrs. Lips, wife of the mayor of Bismarck; Mrs. John Davis, wife of the governor.

She gave a special "thank you" to Mrs. Mackersie.

A very delightful program of piano music was given by Mrs. Kline who was introduced by Mrs. Nugent. Mrs. Nugent presented Mrs. Lyle Limond who gave a very entertaining humorous reading, "Bottoms Up."

Mrs. Waldschmidt introduced Mrs. V. J. Fischer who graciously thanked all committees, convention chairman Mrs. Waldschmidt, and her co-workers.

Mrs. Mackersie installed the following officers:

Mrs. J. M. Van der Linde, president; Mrs. R. W. McLean, president-elect; Mrs. L. T. Longmire, first vice-president; Mrs. J. W. Jansonius, second vice-president; Mrs. Clyde Smith, recording secretary; Mrs. Carl Baumgartner, treasurer; and Mrs. R. L. McFadden, corresponding secretary.

Mrs. J. D. Cardy presented Mrs. Fischer with the past president's pin.

Mrs. Van der Linde made a short acceptance speech.

Motion was then made for convention adjournment.

Postconvention Minutes

The meeting was called to order by Mrs. Van der Linde, who announced she had appointed Mrs. J. D. Cardy, Mrs. V. J. Fischer, and Mrs. Clyde Smith as members of the Reading Committee. She then presented the following list of members as her committee chairmen:

Corresponding secretary—Mrs. Robert McFadden

A.A.P.S.—Mrs. L. T. Longmire

A.M.E.F.—Mrs. John Jansonius

Bulletin—Mrs. A. G. Sathe

Bylaws—Mrs. H. L. Kermott

Civil defense—Mrs. R. Story

Community service—Mrs. S. E. Shea

Finance—Mrs. L. E. Wold

Legislation—Mrs. J. D. Cardy

Mental health—Mrs. Keith Foster

Membership—Mrs. R. W. McLean

Nominating—Mrs. V. J. Fischer

Paramedical careers—Mrs. John Young

Publicity—Mrs. M. M. Heffron

Official publications: managing editor—Mrs. J. H. Mahoney;

Business and circulation manager—Mrs. C. A. Arneson; and

Coeditor—Mrs. Robert Hankins

Program—Mrs. L. T. Longmire

Safety—Mrs. L. L. Hoopes

Student Loan (new member of committee)—Mrs. R. D. Nierling

Today's Health—Mrs. Neville Turner

For historian, she has appointed Mrs. G. D. Gertson, and her parliamentarian will be Mrs. E. L. Grinnell.

Mrs. J. D. Cardy made a motion, which was seconded by Mrs. C. J. Baumgartner, that the list of chairmen be accepted. The motion carried.

Mrs. Fischer moved that a permanent convention file be formed. This file is to be kept up to date and contain the report of each convention committee chairman. Six copies of these reports shall be made and two sent to the president, one each to the convention chairman, recording secretary, treasurer, and the local district which has just had the state convention. Mrs. Longmire seconded the motion. Motion was carried.

Mrs. Cardy discussed the possibility of the Student American Medical Association Auxiliary being included

in some of the activities of the next convention which will be held in Grand Forks. She also requested help from the Woman's Auxiliary to send a delegate to the S.A.M.A. national convention. It was decided that these matters would be brought up at the fall board meeting. Mrs. Fischer moved that a liaison officer be appointed between the S.A.M.A. and the Woman's Auxiliary, such officer to be from Grand Forks and a member of the State Board of Directors. She shall be instructed to report the needs of S.A.M.A. to the fall board meeting. The motion was seconded by Mrs. Waldschmidt and was carried. Mrs. Van der Linde then appointed Mrs. Cardy as liaison officer.

A discussion was held about the possibility of smaller districts helping with the convention. Mrs. Mackersie said the experience Michigan had with such a plan had not been successful. There was no decision made about this.

Members present at the postconvention board meeting were: Mmes. Baumgartner, McFadden, Heffron, McLean, Dahl, Waldschmidt, Arneson, Haunz, Fischer, Cardy, Longmire, Mackersie, Smith, and Van der Linde.

A motion to adjourn was made by Mrs. Longmire and seconded by Mrs. McLean.

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1. Boland, E. W., and Headley, N. E.: Paper read before the Am. Rheum. Assoc., San Francisco, Calif., June 21, 1958.

2. Bunim, J. J., et al.: Paper read before the Am. Rheum. Assoc., San Francisco, Calif., June 21, 1958.

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Care of the Patient with a Stroke,
by GENEVIEVE WAPLES SMITH,
R.N., M.A., 1959. New York:
Springer Publishing Co., Inc., 142
pages. \$2.75.

The subtitle, "A Handbook for the Patient's Family and the Nurse," more accurately describes the purpose of this volume than does the title, as the author wisely does not attempt to review the multiple medical problems which occur in the acute and long-term management of a stroke patient. For many individuals confronted with the need to care for such a patient at home, where no definitive assistance is available from a speech pathologist, physical therapist, orthopedic consultant, and so forth, this book will be of material aid. Chapters are included which cover personality problems, exercises, massage, speech re-education, and nursing. Such a general discussion cannot take the place of a program tailored to the needs of an individual patient by qualified experts who have actually examined him. However, as a primer for outlining home care, this is a very satisfactory piece of work.

C. H. MILLIKAN, M.D.

BOOK REVIEWS

X-Ray and Radium in Dermatology,
by BERNARD A. WANSKER, M.D.,
1959. Springfield, Ill.: Charles C
Thomas Co., 114 pages. \$5.00.

For the student and practitioner in dermatology, this monograph offers a concise study of radiation physics and its application to dermatology. Its conciseness, which omits many details, is the stated purpose of the author; however, the book includes essential information about elementary physics of radiation, the x-ray circuit, and physical factors affecting the quantity and quality of radiation. Specific methods of x-ray therapy of interest to the dermatologist are discussed with relation to such dermatologic conditions as skin

cancers, hemangiomas, verrucae, acne vulgaris, rosacea, tinea capitis, and neurodermatitis. In further abbreviated manner, contact therapy, Grenz rays, and cathode rays are discussed as to their use, advantages, and disadvantages. Short chapters on radium are included, with appropriate charts and diagrams for topical and interstitial therapy. The author, in obtaining assistance from leading dermatologists who have an extensive experience in the use of radiation, has written an authoritative, practical, and concise monograph.

C. GORDON VAUGHN, M.D.

Nutrition and Atherosclerosis, by
LOUIS N. KATZ, M.D., JEREMIAH
STAMLER, M.D., and RUTH PICK,
M.D., 1958. Philadelphia: Lea &
Febiger, 146 pages. Illustrated.
\$5.00.

This is the best summary we have seen of the now rapidly growing literature on atherosclerosis and its control with diet. There is a bibliography of 787 titles. The book is well written, and the data are pre-

(Continued on page 30A)



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News Briefs . . .

North Dakota

DR. LEONARD LEVINE, a native of Winnipeg, Canada, and a specialist in urology, has joined the Grand Forks Clinic. A graduate of the University of Manitoba, he recently completed two years of specialty training at University Hospitals of Western Reserve University.

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DR. E. H. GOODMAN of Napoleon has been appointed Logan County Coroner, succeeding Al Doerr, who has moved to Bismarck.

• • • •

DR. ERIC J. LARSON of Winnipeg, Canada, has been licensed to practice medicine in North Dakota and has joined the Cavalier firm of Drs. Johanson and Helgason.

• • • •

DR. WILLIAM D. WALDSCHMIDT has joined the staff of the Quain and Ramstad Clinic in Bismarck as a specialist in thoracic surgery. He is the son of Dr. R. H. Waldschmidt, clinic chairman. He is a graduate of Stanford University and served his internship at San Diego County Hospital. Also joining the clinic is Dr. Hendrika A. Van Drunen, a pediatrician. A native of The Netherlands, Dr. Van Drunen came to this country five years ago. She is a graduate of the University of Amsterdam and served her internship at Trinity Lutheran Hospital, Kansas City, Missouri, and her residency at Children's Mercy Hospital in the same city. A third addition at the Q & R clinic is Dr. James R. Morton, an internist. He is a graduate of the University of North Dakota and Harvard University.

• • • •

Gov. JOHN E. DAVIS has appointed Dr. G. W. Toomey of Devils Lake, Dr. R. L. Nierling of Jamestown, and Dr. R. W. Rodgers of Dickinson to the State Board of Medical Examiners.

• • • •

DR. JOHN PALMER has been appointed medical director of the state hospital at Jamestown. Palmer, a former medical director at a California state hospital, had been acting director at Jamestown. Palmer's first task is to find replacement psychiatrist, the last of whom left the Jamestown hospital in July.

• • • •

DR. CARROL W. NELLERMOE, a native of Fargo, has joined the staff of the Fargo Clinic as an anesthesiologist and has been named head of the department of anesthesiology. He is a graduate of the University of Washington and has previously been a Navy flight surgeon and resident at Virginia Mason Hospital, Seattle.

• • • •

DR. BRIAN BRIGGS, formerly associated with the Velva Medical Center, has joined the medical staff of the Great Plains Clinic in Minot. A native of Minot, he was graduated from the University of Minnesota, interned at St. Mary's Hospital in Duluth, and served with the U. S. Navy on the hospital ship Haven.

(Continued on page 28A)

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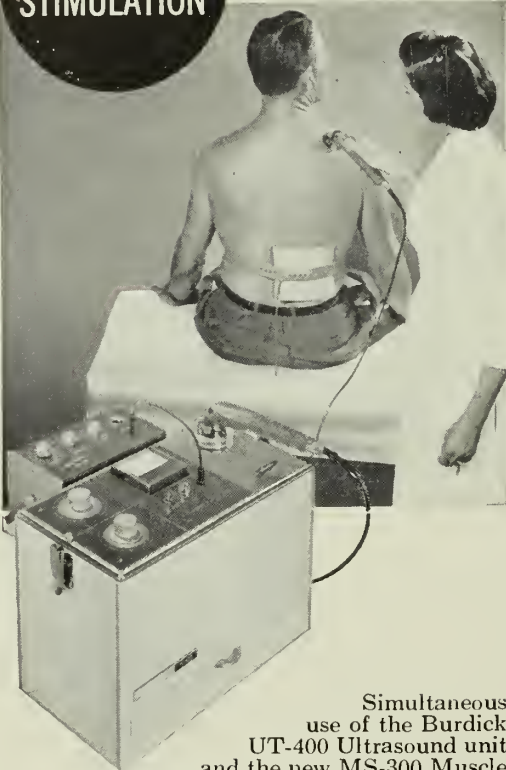
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NEWS BRIEFS

(Continued from page 26A)

DR. VICTOR S. CIPOLLA, a pediatrician, has joined the staff of the Medical Arts Clinic in Minot. A native of Bridgeport, Connecticut, he was educated at Holy Cross College and Georgetown University and worked at Washington Children's and General hospitals.

• • • •

DR. W. G. GARRETT, a pediatrician with the Missouri Valley Clinic in Bismarck since July 1958, has been voted in as a full partner.

• • • •

DR. EDWARD J. HERBA has taken up practice in Mohall. He is a native of Winnipeg, Canada, and a graduate of the Manitoba Medical College.

• • • •

DR. RALPH J. DUNNIGAN has joined the Capital Clinic medical staff in Bismarck as an internist. He is a native of Walhalla and was educated at University of North Dakota and Creighton University. He interned at St. John's Hospital, Detroit, and completed a three-year residency in internal medicine at the same hospital.

• • • •

DR. MONROE FAIRCHILD, formerly chief clinical psychologist at Mt. Pleasant, Iowa, State Hospital, has joined the psychology staff at Jamestown State Hospital. He received master of science and doctor of philosophy degrees from the University of Houston and studied at the Universities of Southern California and Pittsburgh. He worked with the Texas prison system as a psychologist.

• • • •

LAND for New England's proposed medical building has been donated by Phillip Zeren. Plans call for completion of the clinic by July of next year.

Minnesota

DR. FRANK H. KRUSEN, who founded the section of physical medicine and rehabilitation at the Mayo Clinic in 1935, has been appointed special assistant for health and medical affairs to the director of vocational rehabilitation in the U. S. Department of Health, Education and Welfare. He is taking a leave of absence from the Mayo Clinic to serve in his new capacity. His job is to advise the director of vocational rehabilitation on long-range medical programs, policies, and plans related to the expanding rehabilitation plans of the Federal Government.

• • • •

DR. H. P. HINDERAKER has left Bird Island and moved to Willmar, where he will be a member of the Willmar Clinic. Dr. George C. Bingham of Chaska has taken Hinderaker's place in the Bird Island partnership with Dr. Leo O. Furr.


• • • •

DR. MORTON ROAN has had to leave Ellendale because of ill health and has moved to the Twin Cities for treatment. His departure leaves the newly-built \$30,000 Ellendale Clinic without a physician.

• • • •

DR. DAVID W. FEIGAL, Wayzata, has joined the staff of Doctors Memorial Hospital in Minneapolis.

(Continued on page 32A)



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1. J.A.M.A., 170:184 (May 9), 1959.

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BOOK REVIEWS

(Continued from page 24A)

sented in a concentrated form. All statements are well documented from the literature. The authors are properly conscious of the fact that many of the reports that come from laboratories must soon be discounted because of new reports from somewhere else. For instance, it does not appear now that the *adding* of unsaturated vegetable oils to a diet will protect the person from atherosclerosis. The authors conclude, however, that there is a close relationship between the level of cholesterolemia and the development of atherosclerotic disease and also between a certain type of diet and the level of cholesterolemia. In their conclusion, the authors state their belief that the person threatened with atherosclerosis and coronary heart disease should avoid eating large amounts of animal fat, particularly saturated fats. He should avoid fried foods and salads with cheese or sour cream dressing, and he should not keep adding butter, margarine, or cream to vegetables. For desserts, he should use fruit instead of pies, cakes, or ice cream. Overweight persons should reduce

their total caloric intake as well as their total fat intake. They should try to reduce the percentage of calories obtained from fats to 20 or 25 per cent. The usual breakfast of bacon, eggs, buttered toast, and creamed coffee should be tabooed. Breakfast should consist more of fruit, fruit juices, whole grain cereals, skimmed milk, and waffles or wheateakes prepared with vegetable oil and skimmed milk and eaten with honey, jam, or marmalade.

At other meals, meat can be eaten in moderation. It should be lean, with the fat trimmed off. There should be no rich fat-laden gravies and sauces. Poultry and sea foods can be used if cooked simply. There should be an ample intake of vegetables and fruits.

The authors feel that anyone who has suffered from clinical episodes of atherosclerotic disease, such as angina pectoris, mild cardiac infarction, or certain forms of cerebrovascular diseases, should be on a diet. Also, those who are obese, who have hypercholesterolemia, who are hypertensive, who have diabetes mellitus, or who have some renal damage should be on a diet. The authors feel that, if atherosclerosis

can be prevented, its results in the heart and brain can be prevented.

WALTER C. ALVAREZ, M.D.

•
Peripheral Vascular Diseases, by TRAVIS WINSOR, M.D., 1959. Springfield, Ill.: Charles C Thomas Co. \$16.50.

This book is based on long years of clinical experience and an unusual amount of research on the sympathetic nervous system and the dynamics of circulation.

The subjects of arteriography and venography are discussed in detail. The author shows the value of their use and yet discusses the complications that may develop.

Plethysmography is given much space and its value in diagnosis fully explained. Diseases of the arterial system are given much discussion; this chapter alone is worth the cost of the volume.

Pathology of the lymphatic system is thoroughly discussed, but more space could well be given to veins and phlebitis.

This book deserves a place on the shelf of any doctor working in the field of peripheral vascular diseases.

H. O. MCPHEETERS, M.D.



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NEWS BRIEFS

(Continued from page 28A)

DR. NELSON J. BRADLEY, Medical Superintendent at Willmar State Hospital, has resigned, expressing dissatisfaction with the state's mental health program and the recent legislature's refusal to give his institution additional staff and raise salaries.

DR. S. E. POLLMAN and Dr. Leo Herber announced the opening of their practice in Thief River Falls under the name of the Thief River Falls Clinic.

DR. PAUL DREXLER, a native of St. Cloud, has joined the staff of the Litchfield Clinic. He is a graduate of St. John's University and Creighton Medical School, Omaha. DR. JOHN O. FLUEGEL, who has been associated with the Olmsted Medical Group in Rochester for the past year, has been elected a partner of the group.

DR. HENRY S. BLOCH, a native of Germany and a specialist in internal medicine, has joined the Oxboro Clinic in Bloomington. He holds an M.D. degree from the University of Minnesota and a Ph.D. degree in chemistry from Cincinnati University. He is on the staff at University Hospitals.

DR. ROBERT W. DE WERD of Olivia has joined the Owatonna Clinic as a general practitioner. A graduate of St. Thomas College and Loyola University of Chicago, he interned at Milwaukee County Hospital and served as a flight surgeon at Williams Air Force Base, Arizona.

DR. JOSEPH H. ZELENY, a St. Paul native, has become associated with Dr. Edward LaFond in the practice of orthopedic surgery in St. Cloud. A graduate of St. Louis University, he has been a fellow in the department of orthopedic surgery at the Mayo Foundation.

THE UNIVERSITY OF MINNESOTA has announced promotion of the following Mayo Clinic staff members affiliated with the Mayo Foundation for medical education and research division of the graduate school: *Medicine*: David T. Carr, C. H. Hodgson, Robert M. Salassa, and L. Emerson Ward to associate professor and Raymond V. Randall, R. A. Rovelstad, and H. H. Seudamore to assistant professor. *Dermatology*: Richard K. Winkelmann to assistant professor. *Pathology*: R. C. Bahn and E. H. Soule to assistant professor. *Surgery*: William H. Bickle to professor; Oliver H. Beahrs to associate professor; and W. H. ReMine, Jr., to assistant professor. *Neurology*: Clark H. Millikan to professor; David Daly to associate professor; and Norman P. Goldstein and J. G. Rushton to assistant professor. *Ophthalmology*: Robert W. Hollenhorst to associate professor and Thomas P. Kearns and Theodore G. Martens to assistant professor. *Biophysics*: A. L. Orvis to assistant professor.

Deaths . . .

DR. EDWARD W. SENN, 78, died July 19 at Owatonna, Minnesota. A graduate of Hamline University, he practiced in Curry, Minnesota, and started work as an eye, ear, and nose specialist in Owatonna in 1913.

(Continued on page 33A)

NEWS BRIEFS

(Continued from page 32A)

DR. ALEXANDER STEWART, 75, died July 23 in St. Joseph's hospital, St. Paul. He had been on the staffs at Ancker, St. Luke's, Miller and Children's hospitals in St. Paul, retiring earlier this year because of ill health. He was a native of Winchester, Canada, studied at McGill University in Montreal, and came to St. Paul in 1922. At the annual meeting of the Minnesota State Medical Association this year he was honored as a fifty-year member of the profession.

• • • • •

DR. JOHN ABBOTT, 75, of St. Paul, former chief orthopedic surgeon for the Veterans Administration Hospital at Fort Snelling, died August 10 in St. Luke's Hospital, St. Paul. A native of St. Paul, he graduated from the universities of Minnesota and Pennsylvania and was an assistant in surgery at the Mayo Clinic. In World War I, he served with the British expeditionary forces and was a German prisoner of war. He was assistant St. Paul health director in the 1920s and assistant professor of surgery at University of Minnesota. In 1944 he gave up private practice and took on the Veterans Administration position, retiring in 1957.

• • • • •

DR. ROBERT L. FAUCETT, 43, a member of the Mayo Clinic staff since 1953 and an authority on the psychiatric aspects of addiction to drugs, alcoholism, and the abuse of tranquilizing drugs as well as a specialist in the psychiatric problems of children, died on August 5 in Rochester, Minnesota. Death was caused by cardiac arrest and congestion of the lungs resulting from an accidental electric shock. A graduate of the University of Kansas, he served in the Army Medical Corps and the United States Public Health Service, being assigned to the U.S.P.H. Hospital at Lexington, Kentucky. Dr. Faucett came to Rochester in 1949 as a special worker assigned to the former Rochester Child Health Institute, spent two years as head of the Prince Georges County Mental Health Clinic at the University of Maryland, and returned in 1953 as consultant in psychiatry in the Mayo Clinic. In 1955 he was appointed instructor in psychiatry in the Mayo Foundation, being promoted to assistant professor shortly before his death.

• • • • •

DR. L. GORDON SAMUELSON, 55, staff physician at the St. Peter, Minnesota, State Hospital since 1955, died July 16 in St. Peter. Dr. Samuelson was a graduate of Gustavus Adolphus College and the universities of California and Minnesota. During World War II he served as a lieutenant colonel in the Army Medical Corps in Europe, Asia, and the Pacific. Prior to 1955 he practiced for twenty-five years in Mankato, Minnesota.

• • • • •

DR. GUSTAVE L. RUDELL, 83, died August 8 in his north Minneapolis home. He had practiced for nearly 40 years at his office at 800 N. 42nd St. A native of Sweden, Dr. Rudell came to the United States at 16 and worked as a farm hand and janitor before saving enough to attend Gustavus Adolphus Academy. He practiced at Ft. Berthold, North Dakota, Indian Reservation, studied in Vienna, and served as a captain in the Army Medical Corps in World War I. Dr. Rudell was known for befriending young people in search of a college education.

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Clinilab is designed to enable doctors to "perform essential laboratory urine and other studies inexpensively and with ease . . . in the office, clinic, or hospital ward," Ames reports. An extra kit is also suggested to "extend diagnostic scope during house calls" and to save valuable time.

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ABBOTT PRESENTS DRAWINGS



Charles F. Griffin (right), Minneapolis district manager of Abbott Laboratories, Chicago drug firm, presented the University of Minnesota's school of medicine with a group of drawings depicting medical costumes from the time of Hippocrates to the Napoleon era. Accepting the art work for the university was Dr. Robert B. Howard, dean of medical sciences. The drawings were made by Mmc. Warja Honegger-Lavater of Switzerland in water color and ink.

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COMING in *December* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings*

- The general public has many misconceptions about sinusitis, fostered in part by the prevalence of advertisements for proprietary remedies and in part by misapplication of the terms "sinus" and "sinusitis" by members of the medical profession. The most important and frequently stated misconceptions are that the sinuses are responsible for any and all discomforts about the head and neck, that "sinusitis" is incurable, and that surgical therapy must be repeated throughout the lifetime of the patient. Kinsey M. Simonton, M.D., Section of Otolaryngology and Rhinology, Mayo Clinic, Rochester, reports on "Current Treatment of Sinusitis." Infection in the rigid-walled paranasal sinuses presents special problems in management. Therapy is most effective when individualized according to the stage of the disease.

- The special Series on Cardiovascular Disease will include a report on "The Diagnosis and Treatment of Myocardial Infarction" by Richard B. Tregilgas, M.D., of St. Paul and a paper on "Diagnosis and Treatment of Chronic Coronary Disease" by Martin E. Janssen, M.D., also of St. Paul. Dr. Tregilgas outlines and discusses the clinical picture, physical findings, laboratory procedures, and management, including general measures, treatment of complications, and after-care. Dr. Janssen limits his review of the problem of coronary disease to the diagnostic and therapeutic processes available to most physicians.

- Stanley Fruchtmann, M.D., Veterans Hospital, Minneapolis, points out that neither the medical nor the surgical treatment of peptic ulcer is casual. In a paper on "Postgastrectomy Anemias," Dr. Fruchtmann states that the operative approach often leads to discomfort and injuries and one of the harmful effects is frequent anemia.

- The significance of the newer diagnostic tests for rheumatoid arthritis is discussed in a paper by Ralph F. Jacox, M.D., and Edward C. Atwater, M.D., Department of Medicine, University of Rochester School of Medicine and Dentistry, Rochester, New York.

- John G. Freeman, M.D., former director of clinical medicine, State Hospital, Jamestown, North Dakota, and now with the Nebraska Psychiatric Institute, Omaha, writes on "Psychiatric Facilities and Future Possibilities."

- "Surgeon, Educator, and Humanitarian," writes our editor in a special biographical sketch of the well-known Olaf Jensen Hagen, M.D., a true citizen and leader in the great Red River Valley.

Meetings and Announcements

AUTOMOBILE TRAUMA

The Methodist Hospital of St. Louis Park (Minneapolis) will present a symposium on Automobile Trauma, Saturday, November 14. Speakers who will appear at the all-day program include Dr. F. A. Simeone, professor of surgery, Western Reserve University, and Dr. Dana M. Street, chairman, department of orthopedics, University of Arkansas. Category I credit will be given for the day's program by the AAGP. For details, write Dr. Reuben Berman, Methodist Hospital, 6500 Excelsior Boulevard, Minneapolis 26.

COLLEGE OF SURGEONS MEETING

A sectional meeting of the American College of Surgeons will be held January 21 to 23, 1960, at the Brown Hotel, Louisville, Kentucky. Dr. Rudolf J. Noer of the University of Louisville School of Medicine, is in charge of local arrangements. The program will include surgery in the patient with heart disease, selection of therapy for peripheral arterial disease, management of acute arterial injuries, practical techniques in burn care, the role of surgery in thyroid disease, pitfalls in surgery of the biliary tract, and indications for surgery in gastric ulcer.

FRENCH PHLEBOLOGY MEETING

An International Congress of Phlebology will be held May 6-8, 1960, in Chambéry (Savoy), France. Subjects of the survey will be the venous stasis, pain in the venous affections of the lower limbs, and the sclerosing method in its extravascular application. The official languages will be English, French, German, Italian, and Spanish (with simultaneous translation). Secretaries are Dr. J. Marmasse, 3 Rue de la République, Orleans (Loire), and Dr. S. Bourgeois, 8 Boulevard du Theatre, Chambéry (Savoy).

EUROPEAN GASTROENTEROLOGY MEETING

The 6th meeting of the Association of the National European and Mediterranean Societies of Gastroenterology, organized by the Association of Dutch Gastroenterologists, will be held in Leiden, the Netherlands, April 20 to 24, 1960.

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*Hirsch, H. A., and Finland, M.
New England J. Med. 260:109
(May 28) 1959

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Hyposensitization Therapy in Allergic Rhinitis and Allergic Asthma

STEPHEN D. LOCKEY, M.D.

Lancaster, Pennsylvania

ALLERGIC RHINITIS is an allergic disease that occurs either seasonally or perennially. If it occurs seasonally, it can be traced to pollen sensitivity; if perennially, it is usually due to house dust, occupational dusts, some animal hairs and danders, molds, feathers, or foods.

Allergic asthma may occur both seasonally and perennially and is usually due to a combination of any of the aforementioned sensitizers.

Persons acquainted with botany know that pollen is the male fertilizing element of plants. Light pollens that emanate from the trees, grasses, and weeds are air-borne. These pollens combine with the sensitized cell antibodies and cause the explosive antigen-antibody allergic reaction. As a result of this reaction, the sensitive patient then experiences the symptoms of hay fever. A certain percentage of patients are also prone to attacks of asthma during the tree, grass, and fall weed pollinating seasons. The shock organ sites of pollen reaction are located in the mucous membrane that lies in the ocular, nasal, laryngeal, and tracheobronchial areas. Dependent on certain variable climatic factors, seasonal allergic rhinitis usually occurs during the same periods of time each year. In seasonal allergic rhinitis, the nasal mucous membranes are pale, boggy, and edematous. Profuse watery rhinorrhea is usually present. The eyes are affected by the same influences as the nose. Itching of

the eyes, blepharitis, conjunctivitis, and, at times, corneal ulcers occur seasonally.

In atopic perennial rhinitis, the symptoms are present on a year-round basis rather than on a seasonal basis. In many cases, symptoms improve during the summer months and become more intense during the fall and winter months. During the winter months, the patient is exposed to house dust, molds, heating systems, or other irritants present in his environment. Eye symptoms do not occur as frequently in conjunction with perennial rhinitis as in seasonal rhinitis. The eyes, however, are influenced by the same sensitizers as the nose. The delicate tissues react as the nose to dust, fumes, insecticides, animal danders, molds, and so forth.

The diagnosis of simple hay fever, perennial allergic rhinitis, and allergic asthma is based upon 5 factors: (1) the most important—an accurate history; (2) the appearance of the involved mucosa; (3) positive reactions to tests with the specific offending pollens, epidermals, molds, foods, or other excitants; (4) the demonstration of eosinophils in the mucosal secretions; and (5) the correlation of the patient's physical findings, history, and results of skin tests with the physician's knowledge of botany, mycology, and air-borne allergy excitants.

To confirm the fact that the patient is suffering from allergic rhinitis or allergic asthma, the patient must be tested. Most sensitive patients develop positive reactions because their mucous membranes and skin contain reaginic antibodies

STEPHEN D. LOCKEY is chief, Department of Allergy, Lancaster General Hospital, Lancaster, Pennsylvania.

which react to the presence of a specific antigen, to which they are sensitive. It is usually possible to learn to interpret scratch tests made either with dry or aqueous extracts. I advise this safe method of testing. Severe reactions of a constitutional type may develop in patients when they are subjected to intradermal or mucous membrane tests with pollen or pollen extracts. These methods of testing should not be used by anyone who has not received special training. Recent surveys reveal that there are approximately 17,000,000 allergic persons in our nation; 9,500,000 of these suffer from allergic rhinitis. Allergic bronchial asthma usually has its onset in childhood or adolescence. It may also begin during middle life. Untreated, it persists for years and gradually increases in severity, in many cases rendering the patient a "pulmonary cripple." Victims of allergic rhinitis and allergic asthma have a choice of two ways to avoid allergic manifestations. Victims of allergic rhinitis may seek a locality free from the pollens to which their history and diagnostic skin tests show them to be sensitive, or they may take specific hyposensitization treatment. This form of treatment is coupled with environmental and dietary control. Due to economic factors, most allergic rhinitis victims cannot spend several months vacationing in an area that is free of the particular pollens to which they are sensitive. Most of them, therefore, choose to receive specific hyposensitization treatment.

The most effective treatment of true allergic asthma lies in prophylaxis. Here contact between the allergen and the sensitized tissue is prevented by eliminating the allergenic irritant from the patient's environment. Many irritants cannot be eliminated, particularly house dust, occupational dusts, epidermals, molds, and pollens.

Hyposensitization, also known as desensitization, is especially successful with extracts of the aforementioned materials. It is indicated in allergic rhinitis and asthma, especially when allergens that affect the patient cannot be completely avoided. This type of treatment in most cases allows the recipient to withstand ordinary exposure to allergens to which he is sensitive. Most persons who are allergic to pollen can be sufficiently hyposensitized so that, under ordinary conditions, they become completely symptom free. Under extraordinary conditions, they continue to react to the particular excitant to which they are sensitive.

The exact method of desensitization is still unknown. At the present time, a great deal of research is being done in this field. Competent authorities have noted that reactions following

scratch tests diminish or that the reactions fail to appear in patients who have received specific treatment via the perennial method over a period of years. At the same time, it has been noted that, in patients given preseasonal injections over an equal number of seasons, the reduction in the size of the skin reaction is less pronounced. In my experience, the size of the reaction resulting from skin tests is smallest in those treated with high concentrations of specific pollen extracts. Also, clinical result is usually best in these patients.

Prophylactic treatment consists of giving the patient a series of injections of decimally diluted extracts prepared from the specific offending pollens to which the patient is sensitive. This is known as specific hyposensitization. The first physician to use this method of treatment was Dr. Noon of England, after whom the Noon pollen unit is named. The hypodermic method of administering specific extracts has been in use for many years and is well standardized. Successful therapy is especially dependent on the selection of potent, specific, and proper extracts, the contents of which must correspond to the patient's allergies. The material should be in bulk solution so that dilutions can be lowered or raised in accordance with the degree of tolerance. About 85 per cent of pollen hay fever and asthma victims treated with a specific extract prepared from the pollens to which they are sensitive are completely relieved or made comfortable by this method of treatment. The exact method by which immunity is established has not been agreed upon.

The three methods for pollen hyposensitization are preseasonal, coseasonal, and the perennial. In most instances, these methods overlap. Each method has its own application. I employ the perennial method. It produces the best results and fewest reactions. A more lasting immunity is obtained by this method. The two most widely used methods are the preseasonal and perennial. In either method, the initial dose of extract depends on the size of the patient's skin test reaction after he is tested with the serially diluted specific extract with which he will receive treatment. Hyposensitization should begin with that dilution of the serially diluted specific extract which fails to produce a positive reaction.

Illustration:

- | | |
|--------------------------------|--------|
| 1. Control | |
| 2. Ragweed mixture 1:1,000,000 | 0 |
| 3. Ragweed mixture 1:100,000 | 0 |
| 4. Ragweed mixture 1:10,000 | 2 plus |
| 5. Ragweed mixture 1:1,000 | 4 plus |

In this hypothetical case, the patient would first receive 0.10 cc. of the 1:100,000 dilution and then, at weekly intervals, 0.2 cc., 0.4 cc., and 0.8 cc.

If the preseasonal method is used, therapy should be adjusted so that the patient receives from 25 to 50 injections of his specific pollen extract before the pollen season starts. If the patient reports six months in advance, the injections are given at weekly intervals. If the patient reports four months in advance, the injections are given twice weekly at first and then weekly. If he reports one month in advance, the injections may be given three or four times weekly or, if deemed necessary, daily.

The following schedule has been published in numerous textbooks on allergy. I believe this schedule was devised originally by my friend, Dr. Leon Unger.

SCHEDULE FOR PRESEASONAL POLLEN
HYPOSENSITIZATION

<i>Injection</i>	<i>Dilution</i>	<i>Dosage (cc.)</i>
1	1:100,000	0.10
2	1:100,000	0.20
3	1:100,000	0.40
4	1:100,000	0.80
5	1:10,000	0.10
6	1:10,000	0.15
7	1:10,000	0.22
8	1:10,000	0.30
9	1:10,000	0.45
10	1:10,000	0.65
11	1:10,000	0.85
12	1:1,000	0.10
13	1:1,000	0.15
14	1:1,000	0.22
15	1:1,000	0.30
16	1:1,000	0.45
17	1:1,000	0.65
18	1:1,000	0.85
19	1:100	0.10
20	1:100	0.12
21	1:100	0.14
22	1:100	0.16
23	1:100	0.18
24	1:100	0.20
25	1:100	0.22
26	1:100	0.24
27	1:100	0.26
28	1:100	0.28
29	1:33	0.10
30	1:33	0.12
31	1:33	0.14
32	1:33	0.16
33	1:33	0.18
34	1:33	0.20
35	1:33	0.22
36	1:33	0.24

The increases in dosage are only approximate. The dose of pollen extract is raised slowly in

violently sensitive patients and more rapidly in less sensitive patients. When the pollen season starts, the last top dose of extract that the patient has received is reduced by 25 per cent to compensate for pollen antigen that he will absorb from his respiratory and alimentary tracts. Depending on the patient's symptoms, injections are continued at the same level at weekly intervals until the season ends. At this point, perennial treatment is started. Dosage is increased gradually by 0.02 to 0.05 cc. at regularly spaced intervals of one to three weeks. I have thus administered as much as 0.5 cc. of a 1:20 dilution of 5 per cent pollen extract.

When it is too late to start preseasonal treatment, coseasonal pollen treatment is used. Treatment is not started until symptoms of asthma or hay fever appear. Minor symptoms, such as itching at the tip of the nose, sneezing, and mild lacrimation should be disregarded. Treatment should be started if the symptoms are severe and last more than four hours. Using the intracutaneous technic, small doses of pollen extract are administered at frequent intervals. A single dose of pollen extract often provides relief for several days. If this occurs, another injection should not be given until the symptoms return. If they recur, the same dose is repeated, which is 0.10 cc. of the 1:100,000 dilution of pollen extract. If the patient secures partial or no relief after 0.10 cc. of the 1:100,000 dilution extract, 0.10 cc. of the extract is given each day for two or three days. This may provide relief. This procedure should not be repeated until symptoms return. If the patient is not relieved after receiving 0.10 cc. of the 1:100,000 dilution of pollen extract each day for three or four days, the dose is increased by 0.10 cc. each day.

<i>Date</i>	<i>Injection</i>	<i>Dilution</i>	<i>Dosage</i>
1st day	1	1:100,000	0.10 cc.
2nd day	2	1:100,000	0.20 cc.
3rd day	3	1:100,000	0.40 cc.
5th day	4	1:10,000	0.05 cc.
7th day	5	1:10,000	0.10 cc.
8th day	6	1:10,000	0.20 cc.
9th day	7	1:10,000	0.30 cc.
10th day	8	1:10,000	0.40 cc.

After the patient has received preseasonal or coseasonal injections, he is changed to the perennial method with subcutaneous injections given at regularly spaced intervals—once a week for weak dilutions and every two to four weeks for stronger extracts. During the pollen seasons, dosages are reduced by 25 per cent and increased after the season. Patients with seasonal allergic rhinitis do better treated on a perennial

basis. Their immunity and clinical results improve year after year. When discharged, many of these patients continue to remain symptom free for varied periods of time; a percentage remain permanently symptom free. Patients with asthma caused by pollinosis should be kept on perennial treatment for years. They may be discharged when they have been free of asthma for three or four years. The standardization of pollen extracts is important. The method used varies with the allergist. I use the so-called biologic or weight-by-volume standard. One gram of raw pollen is extracted with 99 cc. of diluent. The extract is considered a 1 per cent or 1:100 dilution. I prefer this standard because it is relatively easy to use and easy to standardize against the patient. Some physicians prefer the total nitrogen or protein nitrogen unit. Others use the pollen unit of Noon, in which 1 unit of pollen extract is equivalent to 1 millionth's part of a gram of raw pollen.

The first dose of pollen extract should always be based on the size of the skin test reaction and then be increased relatively. Reactions are usually the result of carelessness of the physician or his assistants.

In my hands, the following technic has proved valuable in the administration of allergen extracts.

1. Always inspect the dosage schedule that has been compiled or the dosage schedule that accompanies the extract.

2. Check solutions before they are injected. Always make sure that the correct one is being used. Be sure that the bottles of extracts contain the proper concentration of extract that is to be administered. Make sure that the bottle or bottles of extract are numbered properly.

3. Withdraw into the syringe the correct amount of extract that is to be administered in minims or cubic centimeters. Introduce the needle under the skin at about a 30° angle with a distribution of about one-half to three-quarters of an inch.

4. After introducing the needle into the subcutaneous space or into the muscle, always withdraw on the plunger of the syringe to make sure that the end of the needle is not in a small venule or arteriole.

5. The patient should remain in the doctor's office for at least twenty minutes after receiving an injection. The physician should look at the site of the injection before the patient leaves and note any local reaction.

6. If there is a swelling of 4 to 6 cm., the same dosage should be used again when the patient revisits the clinic or office. If the swelling is

more than 4 to 6 cm., the next dosage should be reduced by 10 to 25 per cent. If injections are followed by increased symptoms, dosages should be reduced by 25 per cent when the patient revisits the clinic or office.

7. If a constitutional reaction should occur, such as urticaria, rhinitis, asthma, or itching of the mouth or skin, the next dose should be reduced by 50 per cent. Subsequently, the dosage should be raised cautiously or not at all.

8. The dosage should not be increased during the pollen seasons if four or more weeks have elapsed since the last injection or if the patient has a cold.

9. A clean, water boiled syringe should be used for administering each dose of allergen.

10. Before the patient is allowed to leave the office, provide him with some 3/16 to 3/8 gr. ephedrine sulfate capsules plus some 25 to 50 mg. capsules of Benadryl, which he can take if he should experience symptoms after leaving the office. The dose depends upon the age of the patient. Should symptoms occur, instruct the patient to place the powder from one 3/16 to 3/8 gr. ephedrine sulfate capsule on his tongue and to swallow the powder immediately. At the same time, he should also take a Benadryl capsule. He should contact his physician immediately.

11. Direct the patient to avoid strenuous exercise or becoming overheated for several hours after receiving an injection.

12. In administering hyposensitization therapy, it is best to give the allergen extracts in varying locations. Some allergists just alternate the arms; others use three different sites on each arm before returning to the first site. If the latter is done, care should be taken to see that the highest site on the arm is not so high that a tourniquet cannot be applied above it.

13. Reactions are most likely to occur when the injections are given frequently. Allergen circulates in the blood for a considerable period of time. Thus, when injections are being given frequently, the tendency toward reaction is greater. The local subcutaneous reaction that occurs the day after the injection is of no significance. It usually consists of a red, swollen, hot, tender area around the site of the inoculation. This reaction usually subsides within twenty-four to forty-eight hours and is indicative of a good antibody response. An ice cap may be applied to the area if the patient is uncomfortable.

TREATMENT OF REACTIONS

Treatment of reactions depends on their severity. Minor local reactions are not treated. To relieve

severe local reactions, an antihistaminic drug should be prescribed or 3/16 to 3/8 gr. of ephedrine or both. The patient should take these drugs before he leaves the office. In cases of mild systemic reactions, a subcutaneous injection of 0.25 to 0.50 cc. of 1:1,000 epinephrine hydrochloride is given. If necessary, this treatment may be repeated in ten to twenty minutes. Ephedrine sulfate should also be given by mouth. For severe constitutional reactions, I use 0.5 cc. of 1:1,000 epinephrine hydrochloride combined with 0.5 cc. of a 3 per cent aqueous solution of ephedrine sulfate. The total amount of 1 cc. of these drugs is administered subcutaneously. If necessary, the dose of 1:1,000 epinephrine hydrochloride may be repeated in five minutes. A tourniquet should be applied above the site of the injection. During the next five minutes, symptoms caused by the epinephrine will develop, such as palpitation, headache, nervousness, tremors, and so forth. When these symptoms appear, loosen the tourniquet in order to allow a little more of the allergen into the circulation to combat the epinephrine effect. A sphygmomanometer may be used in place of the tourniquet. The patient should be kept in the office until he is fully recovered. In extreme and severe cases, IV injections of epinephrine, ephedrine, aminophylline, ACTH, or a corticosteroid may be given. On occasions, it may also be necessary to give an intracardiac injection of 1:1,000 epinephrine hydrochloride. I know that many physicians combine an antihistaminic or Adrephrine drug with pollen and other extracts. Some allergists feel that reactions are reduced by using this method of treatment. I feel that this method only delays reactions. They occur after the patient leaves the office, and he is then often in a situation in which he cannot receive prompt medical care. I am opposed to combining antihistaminic or Adrephrine drugs with any type of an extract. I prefer to exercise great care to prevent reactions. Local reactions are not infrequent but constitutional reactions are rare in my office. I have trained my associates not to be careless. Yet, I must confess that, on occasions, reactions occur. Constitutional reactions occur less frequently in patients who receive treatment via the perennial method. They are most likely to occur if the pre-seasonal or coseasonal methods of hyposensitization are used.

HYPOSENSITIZATION WITH FUNGUS AND OTHER INHALANT EXTRACTS

Fungi sporulate seasonally. The seasons for fungi are not as clearly marked as are those for pollens, because there are many molds and their

seasons vary from year to year and from place to place. Many textbooks on allergy now contain fungi sporulating calendars. They will prove of value to those who study them. Our mold extracts are made from mold spores. Choice of the extracts is difficult at times. In the area in which I practice, *Hormodendrum*, *Alternaria*, *Aspergillus*, *Penicillium*, *Monilia*, and the *Chaetomium* are the most important molds. When mold sensitive patients are allergic to pollens, extracts of both are used in treatment. Since the mold and pollen seasons do not coincide, they should be administered separately. If the pollen and mold extracts are mixed, one is unable to reach the maximum dosage of both just before the onset of their respective seasons.

Treatment with mold extracts varies with the individual patient. It, however, is about the same as that with pollen extracts. First, the patient is given an intracutaneous skin test with the serially diluted extract that has been prepared for him. Treatment should be started with that dilution of extract that just fails to produce a positive reaction.

Example:	<i>Alternaria</i>	1:1,000,000	0
	<i>Alternaria</i>	1:100,000	0
	<i>Alternaria</i>	1:10,000	2 plus
	<i>Alternaria</i>	1:1,000	4 plus

The first dose of mold extract in the aforementioned case would be 0.10 cc. of the 1:100,000 dilution of *Alternaria*.

Hyposensitization with extracts of the epidermals and other inhalants like house dust, occupational dust, kapok, and so forth is carried out in a manner similar to that used with fungus extracts. Intradermal skin tests with weak dilutions of the extract and a control are advised. Hyposensitization is started with the first negative dilution of the extract tested and then increased. Results are usually good.

House dust extracts are used widely, depending on the source. Some house dust extracts are weak; others are very potent. Results of the tests and injections vary with the strength of the extracts and also with patients. Potent house dust extracts are best made from dust gathered from the following sources: drapes, curtains, mattresses, blankets, furs, upholstered furniture, and walls of homes. Extracts made from dust gathered from the floor should be avoided if possible. Dust should also be gathered from a portion of the cellar wall. A good source is ledges and elevated shelves where dust settles. At least 1 pt. of dust should be collected. Occupational dusts are collected from environments in which the workers' symptoms occur: for example, grain storage bins, grain mills, upholstery shops, floral

shops, bakeries, barns, brooder and hen houses, food processing plants, and so forth. The dust should be obtained from tables, chairs, workbenches, windows, and ledges but not from the floor. A bulk dust extract is prepared from the dust gathered, and hyposensitization is usually started with the first negative solution. Hyposensitization with foods is rarely necessary. It is much simpler to eliminate the food. If the food is essential to the diet, such as milk for children and eggs and wheat for adults, hyposensitization at times becomes essential. The oral route should be employed first. Wheat and egg extracts may be given hypodermically and should be administered separately.

Hyposensitization is only accomplished with a specific allergen or allergens to which the patient is allergic. The principle utilized here, as in anaphylaxis, is the introduction of minimal amounts of specific allergen or allergens at frequent intervals until sensitization decreases. As I stated before, the tolerance and degree of sensitiveness of the patient to a particular allergen or allergens to be used should first be determined so that the initial dose may be gauged accordingly. This is accomplished by skin testing the patient with serial dilutions of the allergens and noting the degree of reaction. The initial dose should be taken from that dilution of extract which gives the minimal reaction. With the scratch method, the first dose should be 1/10 of a cc. of the strongest dilution which fails to produce a positive reaction. With the intracutaneous method, the first dose in the average case should be 1/10 cc. of the highest dilution yielding a moderately positive reaction.

Gradual increases in the dose can be made according to the patient's reaction to his previous dose. The degree of increase in dose depends upon the extent of local reaction and the occurrence of a so-called constitutional reaction consisting of exaggerated symptoms with or without an additional untoward phenomenon. Generally, one attempts to reach a top or maximum dose, which is 100 to 1,000 times the initial dose.

The intervals between doses depend upon the allergen or allergens and the condition under which they are being administered. Let me illustrate. In the treatment of hay fever, the pollen extract or extracts may be injected daily, weekly, or monthly depending upon whether the patient is receiving coseasonal, preseasonal, or perennial treatment. If the perennial method of treatment is used with sustained improvement in the patient's tolerance and clinical condition, the intervals between his injections may be lengthened to three or four weeks and maintained until his improvement warrants discontinuance of treatment. Years of experience for many allergists have shown that, in most cases, hyposensitization leads to an increase in the patient's resistance to ordinary exposure to his offending allergen or allergens.

Specific hyposensitization treatment administered to victims of allergic rhinitis and allergic asthma yields excellent results. It is necessary to continue treatment over a period of years. Specific hyposensitization treatment with mold extracts yields fair results. Excellent results are obtained with occupational dust extracts, provided the patient is not exposed to excessive amounts of the occupational dust while he is receiving treatment.

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The Minnesota Plan for Rehabilitation of the Handicapped

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DESCRIPTION OF THE GENERAL PLAN

FRANK H. KRUSEN, M.D.

IN 1955, Governor Orville L. Freeman appointed me to serve as a member of the Minnesota State Board of Health to develop his interest in services to the handicapped. At the same time, he appointed me to serve as chairman of the Governor's Advisory Committee on Vocational Rehabilitation to the Division of Vocational Rehabilitation of the Minnesota State Department of Education. Shortly after the governor appointed me to the Board of Health, I was elected president of the Board, and I have served in that capacity and as chairman of the Advisory Committee on Vocational Rehabilitation since that time.

I have now been asked by the editorial director of THE JOURNAL-LANCET to describe the developments which have taken place during the ensuing four years in our attempts to strengthen our program for rehabilitation of the handicapped citizens of Minnesota. In order to accomplish this mission, I have asked my coauthors—Dr. Knudsen, Mr. Gehrke, and Mr. Keenan—to join me in describing what has been accomplished.

In the Department of Health, we have developed a general plan for establishment of key, major rehabilitation centers and certain satellite centers, and, in the Department of Education, we have guided the development of a reorganization program which we believe has

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EDITOR'S NOTE: The editors of THE JOURNAL-LANCET are pleased to publish this authoritative report on rehabilitation of the handicapped in Minnesota. This paper takes on additional importance with the announcement that the principal author, Dr. Krusen, is now on three months' leave in Washington from the Mayo Clinic as a special assistant for health and medical affairs to the director of the Office of Vocational Rehabilitation of the Department of Health, Education, and Welfare. Duties will include advising the director on long-range medical programs, policies, and plans related to the current and expanding rehabilitation plans of that office. Dr. Krusen will work with members of Congress, governmental agencies, medical groups, and voluntary agencies in interpreting and developing medical programs relating to rehabilitation.

been extremely helpful in improving our services to the handicapped. It is my hope that this description of the combined efforts of the Department of Health and the Department of Education to improve the medical, psychologic, social, and vocational rehabilitation of handicapped persons will be helpful to physicians in understanding our program.

STATE BOARD OF HEALTH PLAN FOR REHABILITATION CENTERS

HELEN L. KNUDSEN, M.D.

The complete, comprehensive rehabilitation center which provides an integrated program of medical, psychologic, social, and vocational evaluation and services under competent medical supervision serves the total patient. It is no longer considered adequate to teach a person merely how to manipulate an artificial leg. He must also have an understanding of how to deal with the social and emotional problems arising from his handicap, and he must be provided with a means of making a living.

In 1954, the Hill-Burton Act, which provides federal funds to the states for the construction of needed hospitals and public health centers, was amended by Congress to include such complete rehabilitation centers. Prior to receiving funds for construction purposes, each state had to survey the existing rehabilitation facilities and services and develop a state-wide plan for the provision of needed additional centers so that all persons in the state would have access to integrated rehabilitation services for all types of disabilities.

The following summarizes the Minnesota Plan as developed by the Minnesota State Board of Health.

For the present, the state has been divided into 3 large rehabilitation areas, each of which spreads across the entire width of the state as follows:

Area I — Northern: population	544,075
Area II — Central: population	2,174,480
Area III — Southern: population	651,445
Total	3,370,000

Population estimate is as of July 1, 1958, by the United States Bureau of the Census.

Five complete rehabilitation centers are currently proposed by the Board, and 3 of these already are in operation.

Area I—Northern. Duluth is designated for a complete rehabilitation center. This location also could serve portions of Wisconsin and the upper peninsula of Michigan, as is now the practice in the other specialized medical fields. The 3 existing chronic disease units of general hospitals in St. Louis County—at St. Mary's and St. Luke's hospitals in Duluth and the Municipal Hospital in Virginia—also were factors in the decision to designate Duluth as a location for a rehabilitation center. There would be many advantages in combining public health and rehabilitation services in one building constructed as a part of, or in close proximity to, an inpatient care facility. Such a unit would provide inpatient and outpatient rehabilitation services and space for the Duluth City and St. Louis County Health Departments and the District IV Office of the State Department of Health as well as the mental health clinic and voluntary health agencies. This pooling of resources would increase efficiency and effect economies in construction, staffing, maintenance, and operation. In addition, more Hill-Burton funds would be available for the project if it were constructed as a public health center with rehabilitation services, since, in that event, Part C funds could be used variously in the entire facility as well

as in the cost of the site alone. Minnesota's allotments under the rehabilitation facilities portion of the amendment (Part G funds) for the first five fiscal years total only \$474,524, whereas a total of approximately \$24,000,000 has been provided for hospital and public health center construction (Part C funds) since the first allotment in 1948.

Area II—Central. Minneapolis and St. Paul—a total of 3 complete rehabilitation centers is proposed for this area, with 2 in existence at present:

1. The Rehabilitation Center at the Mayo Memorial Medical Center on the University of Minnesota campus in Minneapolis is designated as the base hospital in the Minnesota Hospital Plan. It serves the entire state and also provides teaching and training facilities for personnel in the fields of rehabilitation. A total of \$2,000,000 in Hill-Burton funds (Part C) was utilized early in the program to assist in the construction of the Mayo Memorial, and \$750,000 of this total was specifically earmarked for the construction of the 2 floors devoted to rehabilitation. Another unit of this total facility, the Variety Club Heart Hospital, also received Hill-Burton funds as a chronic disease unit of a general hospital.

2. The Elizabeth Kenny Institute in Minneapolis houses the Curative Workshop on the first floor of the new 3-story addition to the north. This combined unit provides complete rehabilitation services for the entire state as well as for other states and is doing an outstanding job in conducting training courses for physicians, nurses, and other personnel. A new three weeks' intensive course in rehabilitation nursing planned especially for public health nurses has just been initiated. Minnesota's entire first three years' allotments of funds totaling \$202,379 under the rehabilitation facilities portion of the amendment were allocated to this project. Construction was undertaken on July 31, 1959, on a new unit to the south, which will expand the vocational services. This project is sponsored by the Minneapolis Rehabilitation Center, Inc. Minnesota's entire 1958 and 1959 fiscal allotments under the rehabilitation facilities category plus an additional amount of \$67,321.32 transferred from Wisconsin, a total of \$339,466.32 in Hill-Burton funds, have been allocated to this new vocational unit.

3. A complete rehabilitation center is proposed for St. Paul to be constructed at a location yet to be determined.

Area III—Southern. Rochester—the Section of Physical Medicine and Rehabilitation at the Mayo Clinic, with its service at St. Mary's and

Rochester Methodist hospitals, is a complete rehabilitation center, which attracts patients from all over the world and has an outstanding training program for personnel in this field. A community sheltered workshop, Ability Building Center, Inc. (ABC), aids materially in the rehabilitation of certain patients.

Nature of the State Board of Health plan. This plan is revised annually to reflect population growth, social and economic changes, and expanding needs. As the supply of well-trained and qualified personnel increases sufficiently to provide reasonable assurance that additional complete rehabilitation centers will be properly and efficiently staffed, the plan may very well in the future include 1 or 2 additional complete centers to serve the western portion of Minnesota as well as the adjoining states.

All of the existing complete rehabilitation centers are coordinated and used for teaching and training purposes, providing clinical experience for all categories of personnel concerned with rehabilitation. This is extremely important, since it strengthens the entire state program and provides a source of supply to meet existing acute staffing needs.

Although larger communities need the services of physicians especially trained in physical medicine and rehabilitation, many of these services can be given to the patient by other specialists in medicine or by the general practitioner. The misconception still prevails among some physicians that they can refer a patient to a physical therapist, an occupational therapist, a brace man, or a vocational counselor without being familiar with the functions and limitations of such trained health workers and their requirements and needs for medical guidance.

In addition to the existing and proposed complete rehabilitation centers, there are at least 84 other "satellite" rehabilitation facilities in Minnesota which are rendering varying amounts and types of services in this field. These serve a useful function in providing limited rehabilitation services and in creating an awareness of the values and the potentials of rehabilitation. Forty-eight of these centers are connected with hospitals, 35 of which are associated with general hospitals and 13 with state hospitals and state or county tuberculosis sanatoriums; 1 is located in a nursing home; 30 are free-standing centers; and 5 are conducted in connection with schools.

Sites for future rehabilitation facilities should be selected only after thoroughly evaluating the following: first, the availability of trained personnel; next, proximity to hospitals and housing

units, accessibility, ease of future expansion, and adequate parking space. As many as possible of the existing "splinter" or partial rehabilitation services should be coordinated and combined in planning all future rehabilitation facilities.

The value of integrating the services of the various types of rehabilitation facilities with each other and with other care institutions, including general hospitals and their chronic and psychiatric units, nursing homes, boarding-care homes, homes for the elderly, foster homes, and even the patient's own home, has not always been recognized and frequently is not fully appreciated.

We can no longer afford separation of care facilities and services. Nowhere is the inadequacy of old concepts more evident than in relation to disability, chronic disease, and the varied ramifications of long-term illness. Thought and action must be directed in terms of totality of services needed to prevent as well as to restore and maintain these persons at the highest possible levels of health and social effectiveness.

The planning, development, and operation of all the various types of facilities needed for care require careful long-range planning, considerable imagination and resourcefulness, cooperation, and integration as well as the active support of all concerned. This does not mean that every community should provide all or even any of the needed services. But what every community does need is a carefully developed plan to meet its requirements, even though this means traveling a reasonable distance for routine types of care or even greater distances to secure more highly specialized services. In the face of a critical shortage of well-trained and highly specialized personnel in the health field, every possible consideration must always be given to avoiding the development of the small and less efficient partial services, which only accentuate existing personnel shortages by duplication and, as a result, usually are inadequately staffed and provide inferior services.

It is because of these problems that the State Board of Health has directed every effort toward the development of large comprehensive rehabilitation centers first. In these centers, the most efficient and effective use can be made of the extremely limited supply of highly qualified personnel in all the various rehabilitation fields. These, when developed, will make it possible to greatly expand existing training programs. Only after such programs have been expanded to meet our needs can the rapid development of the various rehabilitation services be justified in the more rural portions of the state.

NEED FOR A STUDY OF REHABILITATION RESOURCES IN MINNESOTA

FRANK H. KRUSEN, M.D.

As we developed our program for rehabilitation of the handicapped in Minnesota, it soon became apparent that we needed a statewide survey of rehabilitation resources and a study of ways in which these resources could be more fully utilized and more effectively coordinated. The Governor's Committee on Vocational Rehabilitation then arranged to have the Division of Vocational Rehabilitation of the Minnesota Department of Education, of which August W. Gehrke is supervisor, and the State Services for the Blind of the Minnesota Department of Public Welfare, of which C. Stanley Potter is supervisor, serve as joint sponsors of a research and demonstration project to study these resources and to demonstrate the more effective coordination and increased utilization of such resources. The federal office of Vocational Rehabilitation granted funds for this survey, and Mr. W. W. Keenan, of the State Division of Vocational Rehabilitation, was appointed director of the project. His report on this project follows.

STUDY OF REHABILITATION RESOURCES IN MINNESOTA

And a Demonstration of Their More Effective Coordination and Increased Utilization

WILLIAM W. KEENAN

Rehabilitation of the physically handicapped in Minnesota had its organized beginning about 1920. It has developed considerably since that time, especially in the past decade. This development has been not only in the numbers of handicapped served but also in the resources which are available for serving these persons. As a result of the greatly increased numbers and varieties of new rehabilitation resources, it became very evident that a survey describing the kinds of resources available, their functions, and their capacity to provide rehabilitation services was most necessary.

The central group in initiating the plan for making a survey of the rehabilitation resources was the Minnesota Governor's Advisory Committee on Vocational Rehabilitation, under the chairmanship of Dr. Krusen. On the recommendation of the Governor's Advisory Committee and in conference with the commissioner of education, Dean M. Schweickhard; the assistant commissioner for rehabilitation and special education, August W. Gehrke; and the supervisor of state services for the blind, C. Stanley Potter,

a plan was worked out by which a grant for the study was secured. One of the provisions of Public Law 565 (Vocational Rehabilitation Act), passed by the eighty-third Congress in 1954, stipulated that research studies crucial to vocational rehabilitation could be carried out by states with considerable financial assistance from the federal government. An application for the grant was made and approved for the study to begin on October 1, 1958.

The plan was to identify all the rehabilitation resources in the state and to secure complete information about their services, personnel, and financial and administrative organization, so that those wishing to use the resources could better understand their functions in the community. One of the immediate objectives was the publication of a comprehensive directory of all the rehabilitation resources and services which are available in Minnesota. Another objective was to secure information which would serve as the basis for reports on the distribution, availability, and quantity of services in each area of the state. In carrying out this study, the project director and a secretary were appointed to work with the sponsors of the study in developing lists of basic resources, questionnaire forms, glossary of terms to be used, instructions to interviewers, and the basic plan for covering the state for the purposes of the survey. The project director and supervisory personnel of the Division of Vocational Rehabilitation and the State Services for the Blind were to be used for the actual interviewing procedures. The data obtained from the study are being coded and punched on IBM cards for purposes of tabulation.

The progress of the study to date has been as follows:

1. The development of a basic list of resources by study of other surveys and authorities and by intensive investigation.
2. The development of survey forms which are suitable for covering the variety of complex resources available to the physically handicapped.
3. The development of a glossary of terms which can be used in explaining and orienting resources to the meaning of terms which are used in the survey.
4. The development of instructions for interviewers.
5. The training of 12 interviewers throughout the state in the technics of surveying.
6. The project, as of August 15, 1959, was approximately 85 per cent completed insofar as surveying the actual resources is concerned. Persons in charge of more than 120 of the 144 resources identified have been approached and have cooperated. Only one refusal has been encountered to date. Personnel of both resources and interviewing staffs indicate that they have found the experience extremely valuable to them in understanding resources and how they can fit together to provide the necessary services for handicapped persons.

Barring unforeseen circumstances, the directory of rehabilitation resources is expected to be ready for the publisher within the next six weeks.

THE VOCATIONAL REHABILITATION PROGRAM IN MINNESOTA

AUGUST W. GEHRKE

Inception of the concept of vocational rehabilitation. Historically, Minnesota was one of the pioneers in vocational rehabilitation. When the federal government enacted the first legislation concerning vocational rehabilitation in 1920, Minnesota was among the 8 states which immediately established rehabilitation agencies for the retraining of physically handicapped people injured in industry. Then, when the Federal Social Security Act made the Office of Vocational Rehabilitation a permanent federal agency in 1935, the Minnesota Legislature enacted similar legislation on the state level.

These early years in vocational rehabilitation set the pattern of state-federal financing with state administration that still exists today, but on a much broader level. The basic service provided to the handicapped person was retraining. The Division of Vocational Rehabilitation could make no attempt to restore lost function or to improve the physical capacity so that the person might return to his former occupation, but a limited type of training could be provided to enable him to become employable despite the existence of a disability.

It was in 1943 that Public Law 113 was passed by Congress to lay the foundation for the structure that rehabilitation was to build by means of Public Law 565. Public Law 113 made it possible for the rehabilitation agency to provide physical restoration services, prosthetic devices, more detailed and comprehensive evaluative procedures, and even a limited amount of tools and equipment to clients. It also recognized the mentally ill and mentally retarded as handicapped persons who might well benefit from vocational rehabilitation services.

When Public Law 565 was passed in 1954, Minnesota's Division of Vocational Rehabilitation was a strongly centralized agency, with a professional staff of 23 located in 6 offices and rehabilitating between 500 and 600 persons a year. Spurred on by the recommendations of the Governor's Advisory Committee and a federal survey of the Minnesota program, the agency has reorganized into a statewide network of 14 district and local offices with much administrative authority delegated to the district supervisors. In the fiscal year of 1959, the 57 profes-

sional staff members rehabilitated 1,173 persons and made disability determinations for nearly 4,000 Minnesotans who had applied to the Bureau of Old-Age and Survivors' Insurance for the insurance benefits under the Old Age and Survivors' Insurance laws.

Development of rehabilitation in Minnesota. As he signed Public Law 565, which is the Vocational Rehabilitation Act of 1954, President Eisenhower said, "In the first place, it reemphasizes to all the world the great value which we in America place upon the dignity and worth of each individual human being. Second, it is a humanitarian investment of great importance, yet it saves substantial sums of money for both federal and state governments."

Public Law 565 has done all of these things. By its broad program of grants to facilities and training agencies and new support to the state vocational rehabilitation agencies, it has effected sweeping changes in the concept and effectiveness of the rehabilitation program. Social historians herald this law as "the opening of a new era in the vocational rehabilitation of handicapped men and women in the United States."

In Minnesota, the number of persons rehabilitated each year has doubled since the passage of Public Law 565; the State Division of Vocational Rehabilitation has doubled the size of its staff and number of offices in the state; more than \$500,000 has been spent in Minnesota to provide new rehabilitation facilities for the physical restoration, vocational evaluation, and training of the handicapped. Most of all, it has made the people of Minnesota aware of the scope and nature of the problem created by the social, psychologic, physical, and economic dependency caused by disability and of the facts that community effort and participation are essential to meet this problem.

It is obvious that Public Law 565 provided the means and the spark to kindle the latent aspirations for an expanded vocational rehabilitation program in Minnesota. Governor Orville L. Freeman, who was wounded in World War II, provided this spark. As was previously mentioned, Governor Freeman appointed an Advisory Committee on Vocational Rehabilitation, of which Dr. Krusen became the chairman. This committee provided the dynamic leadership so vitally necessary. The Minnesota State Board of Education and Commissioner Dean M. Schweickhard, as executive officer, gave their wholehearted approval to the improvement and extension of rehabilitation services. The legislature responded with a substantial increase in appropriations so that the staff could be expanded and

services improved. The tremendous effort to explain vocational rehabilitation to the people of Minnesota was performed by the Minnesota Rehabilitation Association, which has many physicians as active members. Minnesota's gains have been truly cosmopolitan, and they indicate what can be done if people of many walks of life work toward a common goal.

The story of rehabilitation is not told simply by numbers. Statistics alone cannot reveal the true development of rehabilitation in Minnesota in the past five years. The increased staff, appropriations for case service, and the rapid expansion of rehabilitation facilities in the state have enabled the division to increase greatly the scope of its service, both in terms of more severely disabled persons who can be served and more extensive services provided to clients. The Division of Vocational Rehabilitation is no longer merely a training resource for handicapped persons but is a coordinating agency that brings together all the resources needed to help a person make a successful social, psychologic, physical, and vocational comeback from dependency created by a disability.

Now vocational rehabilitation can provide its clients with a complete program that might include any or all of the following services: *medical evaluation, counseling and guidance in selecting a vocational objective*, medical services needed to correct a disabling condition or to restore maximal physical potential, prosthetic devices, *training for the vocational goal*, maintenance and transportation during the training period, tools and equipment, and *job placement and follow-up* to make sure the job is suitable for the client and that he is suitable for the job. This follow-up is essential to a successful rehabilitation program, for the philosophy of rehabilitation is based on the premise that a well-trained, rehabilitated worker placed on the proper job is a productive and effective worker hired for his ability—not because of sympathy for his disability.

The services which have been italicized in the preceding paragraph are the basic rehabilitation services, and these are provided without charge to the clients. The others are ancillary services and are provided by the Division of Vocational Rehabilitation only to the extent that the client cannot provide them for himself.

During the past few years, medical science has greatly increased the life span and brought new hope to many victims of diseases which once were considered incurable. This means that many more persons who might have been considered completely beyond the capacities of re-

habilitation services just a few years ago are now likely candidates for rehabilitation, despite severe disability. But, it has only been since the manpower of the Division of Vocational Rehabilitation has expanded through Public Law 565 and additional state financial support has been given that the Division has had the personnel to serve these severely disabled persons. In 1955, only 15 persons with mental illnesses were rehabilitated; in 1959, the number had increased more than sevenfold, to 111. In all categories of severe disabilities, the increase has been almost as remarkable, and each year more and more paraplegic, hemiplegic, and even quadriplegic persons are becoming self-sufficient through the services provided by the Division of Vocational Rehabilitation.

In dealing with all aspects of disability, but particularly with severely disabled persons, vocational counselors have become increasingly concerned about the importance of early contact with the disabled client. Studies have indicated that many vocational problems are created not by the disability itself but by the feelings of despondency and dependency which develop in a disabled person if he is not quickly offered an opportunity to prepare himself for a new life which will make the most of his physical and mental abilities.

Bearing in mind early referral for vocational rehabilitation, Minnesota is revising its cooperative agreement with the Industrial Commission to provide for a closer working relationship, and this agreement must be approved by the governor. To expedite services to those injured in industry, Minnesota has assigned one counselor to review all injuries, and, when it appears obvious that the injured person cannot return to his usual occupation, he is visited and services are explained to him. The counselor then begins to work closely with the person's family physician, the hospital or rehabilitation facility, management, and labor. The Division of Vocational Rehabilitation also recognizes that the disabled individual will live in his own home. Therefore, counseling such a person toward accepting his impairment must include working with and counseling members of his family to accept him for what he is and can do, not for what they think he could or could not do, or, in essence, to show the disabled person *empathy*, not *sympathy*.

Recognizing the importance of early referral, the Committee on Rehabilitation of the American Medical Association is preparing a film showing the relationship between physical, psychologic, and vocational rehabilitation. The film,

which is being produced at various rehabilitation facilities in Minnesota, is designed for professional audiences and will provide general practitioners with much valuable information on when, why, how, and to whom to refer their patients to the appropriate vocational rehabilitation agency.

Minnesota's program of vocational rehabilitation has a close working relationship with the Minnesota State Medical Association. The state agency has an administrative medical and psychiatric consultant who is appointed in cooperation with the Minnesota State Medical Association. In addition, each of the 7 district vocational rehabilitation offices in the state has a local physician, usually an internist, who serves as the district medical consultant. His primary function is to review all medical examinations, guide the vocational rehabilitation counselor in regard to the extent of physical limitations of each disabled client, and maintain liaison with physicians in each respective district. Minnesota is fortunate in that the Division of Vocational Rehabilitation also has had a medical advisory committee for about five years, and, this past year, this committee has become also the scientific Committee on Rehabilitation of the Minnesota State Medical Association. Recently, more and more disabled persons are being referred by the family physician to the vocational rehabilitation counselor. These increases in referral are attributed to the close-working relationship between vocational rehabilitation and the physicians of Minnesota.

Since 1955, when the Minnesota Division of Vocational Rehabilitation began to make determinations of disability for the Bureau of Old-Age and Survivors' Insurance, there has been an increasing awareness of the critical employment problems of older disabled workers. It is a tragic paradox that, at the same time that medical science has noticeably increased man's life expectancy, vocational opportunities for older workers have markedly decreased. An elderly worker who has been disabled by accident or disease faces a truly disheartening task when he attempts to find employment. In view of these facts, it is heartening to note that in just the past year the number of rehabilitated persons who were more than 40 years of age increased 40 per cent as compared with the previous year, while the increase in the number of rehabilitated persons less than 40 years old was only 19 per cent.

This means that rehabilitation counselors are spending more and more time counseling this older group and are providing some type of per-

sonal adjustment training to develop a feeling of competence and confidence aptly described as "job-readiness." Finally, counselors are devoting more time and emphasis to placement, knowing what job opportunities do exist for older workers, and developing contacts with employers so that employers will think of the vocational rehabilitation agency as a resource when jobs are open in their plants.

To stimulate the development of rehabilitation facilities to provide this extensive evaluation and personal adjustment training, Public Law 565 also established a program of matching-fund grants to community organizations to establish or improve rehabilitation facilities of all types but recommending that emphasis be placed on vocational problems. Approximately \$500,000 has been spent in Minnesota under this section of the law. These funds have been used by many facilities ranging from the complete rehabilitation centers, such as the University of Minnesota Hospital and Elizabeth Kenny-Curative Workshop Institute in Minneapolis, to the small rural community workshop, such as is now being established in Pipestone. Other recipients of grants in recent years include the Iron Range Rehabilitation Center in Virginia; the Ability Building Center in Rochester; Goodwill Industries; St. Paul Rehabilitation Center; Cerebral Palsy Workshop in St. Paul; Office Services, Inc., in Duluth; and Minneapolis Office Services, Inc. During the past year, grants were made to organizations in both Minneapolis and St. Paul to conduct demonstration projects in social adjustment clubs for persons coming out of mental hospitals as a first step toward their vocational rehabilitation.

An extension and improvement grant also has been made to the Opportunity Workshop for mentally retarded persons in Minneapolis. It had been intended that this facility would provide service for the entire state, but, after only one year of operation, it is becoming obvious that this workshop may be able to serve only a segment of the population of Minneapolis. Arrangements are being made so that the Opportunity Workshop will become an extension of services to Minneapolis schools in a cooperative effort with the Division of Vocational Rehabilitation. The Opportunity Workshop is unique in that it has a close, cooperative working relationship with the Division of Vocational Rehabilitation.

Minnesota recognized the plight of mentally retarded persons when it made the foregoing grant. Some of the insight was gained because of the fact that I am an assistant commissioner

of education and as such also administer the Special Education program, which is compulsory for all handicapped persons except those of the trainable classes. During the past year, there has been an increase of 84 per cent in the number of school districts which have started classes for those who are mentally retarded. A question that school superintendents and others ask is, "When the retarded have reached their maximal potential in special classes, then what?" This is a challenge. It is hoped that such persons will not need to be placed in institutions, and Minnesota is presently working on a plan for their rehabilitation. It is certain that this program will require many workshops scattered over Minnesota, because rehabilitation should be carried out near the home of the disabled individual. There should be comprehensive facilities for purposes of evaluation, but then the disabled person must return to the home community and many can never compete in industry. Society must then decide if work should be provided so that disabled people can be employed up to their maximal potential—even if they earn 10c a day—or if they should simply sit and vegetate in their homes or be sent to an institution. We think Minnesota has made its decision and knows what it intends to do.

Minnesota further recognizes that much remains to be done. Standards of performance must be established. Criteria must be developed to guide communities in setting up facilities for rehabilitation or workshops to guide groups who are interested. It is Minnesota's basic philosophy that vocational rehabilitation of the disabled person is a community problem. The state and nation must provide leadership and money to help finance the inception of such work as well as the continuance of the programs. We know that this interest exists because inquiries have come in from cities such as Fergus Falls, Mankato, Albert Lea, Austin, and many other communities.

The challenge before us. Despite the advances made in rehabilitation in Minnesota, even greater efforts must be put forth in the years ahead before the program will serve adequately all the handicapped persons of the state. During the past year, the Division of Vocational Rehabilitation released more patients as rehabilitated, accepted more new cases, and served more clients than in any other year in its history; yet, at the end of the year, there was an increase of more than 200 in the backlog of persons awaiting investigation to determine eligibility for service.

An Interim Commission, established by the Minnesota Legislature in 1957 to study the prob-

lems of employment of the handicapped, has reported that approximately 10 per cent of the total population of the state has some degree of disability. Obviously, not all of these people need vocational rehabilitation, but the same report indicates that, in 1958, there were 22,000 unemployed handicapped persons of working age who were seeking employment. The majority of these people would be potential clients if the Division of Vocational Rehabilitation had the staff, facilities, and resources to aid them.

At present, there is a bill before the United States Congress for the extension of rehabilitation services to thousands of persons who are so severely disabled that state agencies cannot provide services to them because it is impossible to reasonably predict their potential for future employment. However, it is contrary to a fundamental philosophy of our nation to deny any person the opportunity to become independent and selfsustaining to the maximum of his physical and mental capacity. When this legislation is passed, it will necessitate greater expansion of the state-federal partnership of vocational rehabilitation and present a new challenge to every discipline in the field of rehabilitation.

It is significant to note that, for about twenty-five years, Minnesota has been a national leader in providing a program of craft training and the merchandising of products made by disabled persons in their homes. This service has been performed in cooperation with a nonprofit organization known as "Minnesota Homecrafters." This service has been available basically in metropolitan areas and is gradually being extended to rural areas. Many severely disabled persons have taken full-time employment after several years of training in crafts, an action which has given them incentive and encouragement to consider further physical restoration and instruction at a comprehensive rehabilitation facility. One such case is that of an Indian boy who became a delinquent and spent some time at a boys' training school. Later, he severed his spinal cord in a jail break and became paraplegic. He became a state charge in a rest home. He was referred to vocational rehabilitation and after evaluation was determined not capable of regular service and was then referred to the section dealing with homebound disabled persons. That section served him for about eight years. With a new look toward total rehabilitation, the vocational rehabilitation counselor, in cooperation with the attending physician, sent him to the Sister Kenny Institute for prevocational instruction. After two weeks, he was placed in industry, where he earns \$1.75 an hour.

This is indicative of the philosophy of the rehabilitation program in Minnesota that independent living is only the first step up the ladder toward the ultimate goal of total rehabilitation. Regardless of the severity of the disability, each client should have the privilege of performing remunerative, gainful activity up to the maximum of his potential, irrespective of the cost. We believe that each person wishes to maintain his dignity, feel the few pennies jingle in his pocket, and modestly say, "Yes, I earned this money."

Conclusion. Therefore, the present rehabilitation effort in Minnesota, extensive as it may seem in comparison to the work of just a few years ago, must be viewed as the foundation for a future program that will provide complete medical, social, psychologic, and vocational rehabilitation for all the handicapped persons of the state.

Such a program undoubtedly will be costly, yet failure to meet this challenge will place an even greater burden upon the economy of our state, for the cost of rehabilitation is a one-time expense, whereas the costs of dependency caused by disability go on and on. In Minnesota, statistical reports show that the persons rehabilitated in any given year will, through the state and federal taxes which they pay, repay the entire cost of that year's rehabilitation appropriation in less than four years.

Dr. Howard Rusk of the Institute of Physical Medicine and Rehabilitation, New York University, has estimated that, unless sudden and dramatic progress is made in our nation's rehabilitation efforts, by 1985 every American worker will have to earn enough to care for another person who has been disabled by accident, disease, or age.

Can Minnesota afford to ignore this challenge?

CONCLUSIONS

FRANK H. KRUSEN, M.D.

It can be seen that, after four years of effort, a combined program, which has involved not only the Department of Health and the Depart-

ment of Education of our state government but also the State Services for the Blind of the Department of Public Welfare and has received material assistance from the federal Office of Vocational Rehabilitation, has resulted in very definite benefits to the handicapped citizens of Minnesota.

Three large, general rehabilitation centers are now functioning effectively, and 2 more such centers are being planned. Many satellite centers in the rural areas are bringing rehabilitation to the more remote regions of the state, and real progress is being made in surveying these centers and coordinating their work and that of the large centers.

During the fiscal year 1958-1959, 1,173 handicapped Minnesotans were retained in new occupations as a result of this coordinated effort. This compares with 582 handicapped persons rehabilitated in 1955. A very significant fact is that not only are these persons taken off the public relief rolls but they also pay back in taxes in only a few years the amount that it has cost to retrain them.

The total cost of the 1958-1959 fiscal year's program was \$1,367,209. Of that amount, 63 per cent was provided by the federal government and 37 per cent by the state government. It has been estimated that the total earnings of rehabilitated persons, based upon weekly earnings, was more than \$3,000,000 during the year and that they paid estimated state and federal taxes of nearly \$400,000.

Although these evidences of the economic soundness of rehabilitation programs for the handicapped are significant, the human values are even more important. Not only can we save taxpayers' dollars by providing good programs of rehabilitation for the handicapped but also, and far more important, we can preserve human dignity and lead many of our disabled neighbors out of lives of dependency and frustration into lives of self-sufficiency and self-respect.

This, then, is a humanitarian effort of the greatest significance, and, in answer to Mr. Gehrke's query, "Can Minnesota afford to ignore this challenge?" the answer, obviously, is "No!"

The History and Nature of Smallpox

ROBERT ROSENTHAL, M.D.

St. Paul, Minnesota

"Old Plagues Don't Die." From PHILIP D. JORDAN, *The People's Health: A History of Public Health in Minnesota to 1948*. St. Paul: Minnesota Hist. Soc., 1953.

SMALLPOX was truly one of the most feared epidemic diseases of all times, not only because of its high mortality but also because of the horrible and disfiguring changes it produced in its victims. The historic beginnings of smallpox are shrouded in doubt, but there is abundant evidence to indicate the antiquity of the disease. One cannot tell for certain whether smallpox was prevalent in China and Egypt in the twelfth century B.C., even though Ruffer and Ferguson attempted to prove its presence by the examination of sections of skin lesions from the mummies of Rameses V. Their account, "Note on an Eruption Resembling That of Variola in the Skin of a Mummy of the Twentieth Dynasty (1200-1100 B.C.)," was published in 1910 in the *Journal of Pathology and Bacteriology*.

Furthermore, no adequate evidence pointing to the existence of smallpox can be found in either Greek or Roman literature before the Christian Era. Galen, in the second century A.D., painted a most suggestive picture when he described a black exanthem covering an entire body and spoke also of many lesions which changed into ulcers. Eusebius, bishop of Caesarea, related the details of an epidemic which took place about 300 A.D. Here are mentioned spreading ulcers, loss of sight, and many deaths. Marcus, bishop of Avencher, took great care to indicate the spotted appearance of patients taken sick in the year 570 when both Italy and France faced epidemics. Indeed, it is at this time that the term "variola" seems first to have been used to describe the spotted appearance. Gregory of Tours wrote of an epidemic in his city after 573.

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DESCRIPTION

The first clear-cut description of smallpox, however, is attributed to Rhazes who, around the year 1000, produced a manuscript entitled "Treatise on the Smallpox and Measles." This, of course, has become a classic in the annals of medicine. It is not known exactly when Rhazes wrote the article, but it was certainly written after the *Liber ad Almansorem*, probably about 910. The best known edition is the English translation by William A. Greenhill, which was published by the Sydenham Society in London in 1848. During the middle ages, smallpox was commonplace throughout the Moslem countries. By the close of this period, the disease had become widespread not only in Europe, Asia, and Africa but also the Americas. From the late fifteenth century, practically all pediatric treatises contained accounts of both smallpox and measles. During the next century, smallpox had become so common in some countries that it was generally held that almost everyone would contract it at some time during his life.

Actually, the term "smallpox" is of English origin, having appeared early in the sixteenth century as a translation from the French expression *la petite vérole*. This was employed in contradistinction to *la grosse vérole*, which referred to syphilis. The term itself, therefore, seems to imply some recognition of the similarity of some phases of the eruptions in both smallpox and syphilis. Yet, there was still confusion in regard to nomenclature. The same type of confusion was present in the Germanic country: between the fifteenth and seventeenth centuries, the term *Blattern* was applied mainly to lues. But, beginning in the eighteenth century, *Blattern* lost its former connotation and was reserved for smallpox. It is interesting to note also that

not until about 1630 did the English mortality returns list smallpox as a separate disease.

The seventeenth century is noted also for the publication of excellent clinical descriptions of the disease. Thomas Sydenham, for example, distinguished between the discrete and the confluent forms. He also advocated a cooling regime rather than a heating regime, which was popular among others of his time. Spirited arguments went on not only in regard to cooling versus heating but also as to the efficacy of bloodletting, vomiting, and purging.

Clinical acuity and debate, however, did little to stem the almost unbelievable spread of smallpox. It was a plague on the fleetest of feet. During a single forty-year period early in the eighteenth century, almost one-fourth of London's population succumbed to smallpox. In 1760, it was considered the primary cause of death among infants and children. And the disease most certainly was not confined to England. Rosen von Rosenstein, father of Swedish pediatrics, reported in an excellent chapter on smallpox in 1764 that every year one-tenth of the Swedish children died of the disease. The first Swedish edition of his book, *The Diseases of Children and Their Remedies*, appeared in 1753 and was later translated into many languages. There is no doubt but that smallpox was definitely a disease of childhood. Statistics from Berlin for the periods 1758 and 1774 showed a total of 6,705 deaths. But the important fact is that of this total, 5,876 were children under 5 years of age. The eighteenth century, in general, witnessed one epidemic after another throughout the world.

INOCULATION

It is little wonder, then, that inoculation, or variolation, should become most popular. One need only to recall the role played by Lady Mary Montagu or the inoculation of Catherine the Great of Russia and her family by Lord Dimsdale and the acceptance of the principle in Russia and other countries to be convinced of the popularity of this preventive technic.

The first printed notice concerning inoculation appeared in England in 1714 in the *Philosophical Transactions of the Royal Society of London*. This was a letter written in 1713 by Emanuel Timoni to Dr. John Woodward, which read "An account, or history, of procuring of the smallpox by incision or inoculation as it has for some time been practiced in Constantinople." It was based on the recognition that an attack of smallpox brought immunity. Although this concept was widely accepted, it most certainly was not

endorsed by all groups. Indeed, a bitter pamphlet war raged between 1728 and 1743 in which clergymen took an active part, preaching sermons both for and against inoculation. Despite objections from both clergy and laymen, certain positive proofs supported the cause for variolation. A severe epidemic in Charleston, South Carolina, was stopped; Benjamin Franklin's statistics were favorably received;^{*} George Washington, at the suggestion of John Morgan, prepared his forces for the siege of Boston by using the technics. The great nonmedical men differed. Voltaire, for example, supported variolation, but Kant, the German philosopher, opposed it. It never became as popular in America as in Europe.

It was the nineteenth century in which the romantic medical story of the introduction of vaccination by Edward Jenner was to unfold. He himself had practiced inoculation, but the novel procedure immediately put an end to the variolation problem. Jenner, as is well known, carried out his famous experiment on an 8-year-old boy in 1796 and two years later published his monumental *An Inquiry into the Causes and Effects of the Variola Vaccinae*. The Royal Society had refused his first paper on the subject. Jenner seemed to feel that it was essential to take vaccine from a person who had contracted the disease naturally. He campaigned for this with an exemplary dedication, and perhaps his fame rests more upon this than upon his experiment. In the United States, Benjamin Waterhouse repeated Jenner's experiment upon 7 persons, having learned the method in 1799 when he published *Something Curious in the Medical Line* in the *Columbian Sentinel*. Not one of those treated by Waterhouse contracted the disease. He published his *Prospect of Extirminating the Smallpox* in 1800. Two years later, an inoculation institute for the poor was established in New York City. But, curiously enough, propagation of the virus in cows or calves for the purpose of vaccination came much later—in Italy in the 1830's, in France in 1864, and in Germany in 1865. Not until 1870 did the United States follow. At this time, propagation was begun in Boston.

For many years, three major varieties of types

^{*}BENJAMIN FRANKLIN: *Some accounts of the success of inoculation for the smallpox in England and America, together with plain instructions, by which any person may be enabled to perform the operation and conduct the patient through the distemper*, London, 1759. Here a comment is necessary because it is not well known that this work really consists of two pamphlets: (1) the "plain instructions" were written by Dr. William Heberden of London at Franklin's request but printed anonymously and (2) the "some accounts," a pamphlet of four pages, Franklin wrote after Heberden's publication for the purpose of distributing them together.

of variola have been recognized in their clinical forms: *variola major*, true smallpox; *variola minor*, *alastrim*; and *vaccinia*, cowpox. In some areas *alastrim* is called Cuban itch, amass, kaffir pox, or milkpox. Until the close of the nineteenth century, virulent epidemics were relatively common, but gradually the *variola minor* type became prevalent. Today *variola major* occurs generally only in such countries as India, China, and Mexico. However, sudden changes do occur at times, as was seen in Minnesota in 1924 and 1925, or come about as the result of an introduction from outside, such as the short, sharp outbreak in New York in 1947 when the disease was imported from Mexico. *Variola minor*, or *paravariola*, was first observed and recognized as such in Jamaica in 1865. It is now considered different clinically and epidemiologically but identical bacteriologically and immunologically.

ETIOLOGY

The etiology of smallpox was not too easily established. John Buist first described inclusion bodies in 1887. This man of Edinburgh then considered inclusion bodies to be the contagium of smallpox and cowpox. A more adequate description was given by Paschen in 1906. He demonstrated the inclusion bodies in *vaccinia* vesicles. Later, they were demonstrated in calf lymph and tissue cultures and, more recently, in smallpox vericles. They now are accepted as the actual virus of smallpox and cowpox. When they are removed from vaccinal lymph, the lymph becomes inactive.

Observations with an electronic microscope have made it possible to distinguish differences in size, shape, and grouping between smallpox and chickenpox viruses. The distinctive features of each finally gave a death blow to the old theory which held that smallpox and chickenpox were one disease, different only in degree. The specificity has been proved by immunologic methods. The resistance of smallpox virus to glycerin and the latter's destructiveness to other organisms renders it an excellent preservative of lymph. The use of sterilized glycerin was first suggested by Robert Koch. The virus may be destroyed also by heat at a temperature of over 130° F. and by potassium permanganate. When passed through animals, the virus is changed to that of *vaccinia*, with which animals are easily infected by inoculation.

Smallpox, of course, is highly infective in each stage. Virus may be found in the skin and the mucous membranes. Only in the early stages, except in fulminant cases, is the virus found in the bloodstream. During the incubation period

and the early stages of invasion, the disease is decidedly less contagious and is even denied by some investigators. It is true, however, that it is very contagious all through the eruptive stages up to the time when the scabs have all disappeared. It is well known that a mother can transmit the disease to her fetus. Animals in general are not susceptible. But both animal and human carriers can easily transmit the virus as may physical objects, such as clothes and bedding, which have been contaminated by secretions from patients. Although dried virus does not survive over ten days, virus kept in a tightly closed glass container may, as a scab, remain virulent for almost a year.

It is generally agreed that the virus is absorbed by the mucous membranes as it enters the upper respiratory tract. In most cases, the incubation period lasts about twelve days. It is possible, of course, for smallpox to be inoculated through skin or mucous membrane, but infection through normal skin seems impossible. No age group can be said to be immune, but the disease strikes infants and fetuses more particularly. Prior to the vaccination period, smallpox was considered essentially a disease of children, and especially younger children. In unvaccinated populations, children under the age of 6 years comprised almost five-sixths of all deaths. At present, most children are protected, and older people are now losing or have lost their immunity. This is the reason that more smallpox cases and more deaths are seen among adults during an outbreak.

Constitutional symptoms, especially during the invasion stage, are caused by the toxin. The tendency for petechiae and heavy hemorrhages to occur has been ascribed to an angiolytic faculty of the virus and is probably the influence of the toxin which enables it to enter the bloodstream. *Vaccinia* seems able to do the same occasionally and then develop into *vaccinia generalisata*.

The incubation period, as mentioned earlier, lasts from eleven to twelve days, but variations ranging from eight to fourteen days are not very uncommon. Mild forms (*alastrim* and *varioid*), as in other contagious diseases, may have a longer incubation period which may run fifteen days or more. In general, this period is free from symptoms, although anorexia, some malaise, and headaches may develop toward the end. A rather sudden onset ushers in the early stage of toxemia or the invasion period. A severe chill manifests itself, especially in adults, and vomiting and convulsions appear primarily in children. Within twenty-four hours, the fever rises to 102° to 104° F. At the same time, the pulse and respiratory

rates rise rapidly. Nausea, emesis, malaise, dizziness, and prostration are common. Severe, low backaches are particularly characteristic. Mild forms, of course, show milder prodromal symptoms. Occasionally, a prodromal rash can be discerned during the first day of illness, but it is of short duration. At times, most often in the hemorrhagic type of variola, petechiae or purpura appear during the invasion stage.

In the average smallpox case, the marked prostration and malaise improve in three to four days, and the fever improves also. At this time, the eruption begins to appear and usually is completed within two or three days. It most frequently appears first on the forehead, temples, or wrists and then spreads to the back, arms, and breasts. From there, it marks legs and feet. In contrast to varicella, the lesions in a given area are of the same age. Another point of difference is a tendency to centrifugal distribution, which means that the eruption is more pronounced on the head, forearms, and lower legs as well as upon the shoulders and upper trunk than on the lower trunk.

It has been known for a long time that irritated areas show more numerous lesions or a confluence of lesions. Indeed, this was described excellently by Rosen von Rosenstein in 1765 when he reported the case of a boy who broke out following a severe caning. Lesions very soon change from red macules to darker nodules that are quite firm. Five to six days after the onset of the illness, the lesions become vascular and often are surrounded by a somewhat irregular red area. They remain firm and glistening for a time, but the early lesions soon show a central depression. A definite change is noticeable by about the ninth day after the onset. The pocks became pustular and frequently have a multilobular appearance.

The symptoms of prostration, fever, and so forth, which ease up just before the exanthem appears, return with its appearance and usually reach a maximum during the pustulation stage. The patient feels miserable, has severe headaches, and complains of pain in the back and the extremities. Usually, the more pronounced these symptoms are, the heavier the eruption. Mucous membrane lesions are relatively common. They appear in the mouth and pharynx, the larynx and the nose, the conjunctivae of the eyelids, and the vulva and vagina. These affected areas show much inflammatory change and are a source of real discomfort. Other symptoms, depending upon location, may be puffiness or even closure of the eyes, hoarseness, or difficulty in swallowing.

The change into complete pustules is usually completed in a day or two. They now protrude even more above the skin. Involution begins within two or three days when the pustules begin to shrink and dry up. Previous sensations of burning and pain are now replaced by severe itching. Many pustules rupture. The foul odor from the thick, tenacious pus brings additional discomfort. Fortunately, the drying process proceeds rather rapidly, and scabs begin to form. These scabs, unfortunately, are most common on the face. Unless there are secondary infections of the lesions—which, at times, have led to sepsis—practically all constitutional symptoms begin to recede at this time. The period from the onset of the eruption to the drying-up process usually runs a course of eleven to twelve days. This span, of course, is shorter in mild cases. The length of time required for the scabs to shed also varies with the type of case. In severe cases, shedding may take three to four weeks, with the total duration of the disease lasting five to six weeks.

The question of permanent, pitted scars always has been of utmost importance to both patient and physician. Usually, such scars are present when the deeper layers are involved, but, occasionally, even these lesions are followed by hyperemia and complete disappearance. Such an eventual disappearance, however, may take a long time.

Smallpox manifests considerable variety in its clinical appearance, and the various forms have different prognoses. It is usually true that the milder the case, the scantier the eruption. The severest form, however, is the hemorrhagic type of which two varieties are recognized: the *variola purpurica*, or true black smallpox, and *variola hemorrhagica pustulosa*. The former, the most malignant form, is practically always fatal. In these cases, the purpuric lesions appear even in the state of invasion; the incubation period is shorter than in any other form; and all symptoms are extremely violent. Death usually occurs before the sixth day. There are times when it occurs no later than three or four days after the onset. It can occur even before the true exanthem appears. The second form, the *variola hemorrhagica pustulosa*, although more common than the first form, is only slightly less fatal. Lesions in all stages may exhibit hemorrhages. If death occurs, it does so after one and a half to two weeks. It is interesting to note that this form—like noma—usually appears in debilitated patients or after some other illness.

Next in severity is the confluent type. Here, too, all symptoms are severe from the onset.

The exanthem spreads rapidly and is most extensive. Indeed, the extension may be so great that large areas present a continuous purulent involvement. The mucous membranes are much involved, septic complications are frequent, and the mortality rate is high.

Our generation, however, is better acquainted with variola minor or alastrim than with the forms previously mentioned. Variola minor is a true, but mild, smallpox which occurs among unvaccinated persons. Its incubation period is long—according to some clinicians as lengthy as twenty days. Its systemic manifestations are relatively mild, and the total number of pocks is small. Many of the lesions may not even suppurate. Total duration of this illness usually covers a period of three weeks or less. This form of smallpox apparently is caused by a mild strain, which fortunately does not revert to a violent strain. It is undistinguishable from the virus of severe forms, but it is much less toxic and furthers less the secondary growth of streptococci. The mortality in some epidemics is under 1 per cent.

A second mild type of the disease is *varioid*. This, however, is not a naturally mild form but is one that has been modified by vaccination. The vaccination, however, must have been accomplished far enough in the past so that, through the years, it has lost its efficacy in preventing the disease. Depending upon how much immunity is left, varioid varies greatly. It may, of course, be fairly severe. It is common to find only a slight rise of temperature with the appearance of the exanthem or none at all. During the entire illness, toxicity is much less than in other forms of the disease. Although eruptions may be mild, they may be crowded in certain areas. There may be little permanent scarring, and often there is none at all.

The difference between varioid and alastrim can be readily appreciated only during epidemics, because clinically they look much alike. Alastrim, of course, always produces mild cases even in unvaccinated individuals, while unvaccinated contacts of varioid come down with true smallpox of the type that is prevalent.

In the past, complications resulting from smallpox were most common. Septicemia, usually due to streptococci, practically always ended fatally before the introduction of the antibiotics. Septicemia was the result of secondary skin infections, such as impetigo and furuncles. Such infections usually manifest themselves during the phase of scab shedding, which generally takes place about the fourth week after the onset. Other secondary infections may take the form of spreading cellulitis, local gangrene, or decubital ulcers.

Another feared complication, although less common, was erysipelas, especially of the face. Furuncles in the external meatus of the ear or suppurative otitis media were relatively common among children.

True pocks on the conjunctivae of the eyelids, but only rarely on the eyeball, are a common complication. Eye pathologies were frequent enough in the prevaccination era to contribute perhaps the highest percentage of persons in institutions for the blind. Only rarely do complications occur due to toxic damage of kidneys, brain, or other organs.

DIAGNOSIS

Differential diagnosis is not always easy. A severe attack of influenza may produce symptoms much like those of smallpox during the invasion period. The prodromal eruption may simulate measles, scarlet fever, or a "toxic erythema." Severe hemorrhagic measles may be difficult to differentiate from the hemorrhagic forms of smallpox. Alastrim or varioid have been mistaken for varicella, but the latter rarely shows severe prodromal symptoms and there is no secondary rise of fever with the eruption. A disease which, of course, does produce lesions similar to smallpox is the rickettsialpox. However, this appears only in small and rare epidemics. The benign course (no mortality), the lack of complications, and the absence of scarring should point to a correct diagnosis. It has been pointed out that the rickettsialpox looks like severe varicella in adults.

One would not think, either, that lues could produce difficulties in the differential diagnosis. Yet, this happens. In 1937, one case of mild smallpox was introduced into St. Paul. Because of the social history of the patient, lues was suspected. Not until the patient had infected 12 persons with smallpox was a proper diagnosis made. The coppery color of the lesions, the chronicity, and the presence of spirochetes and a positive Wassermann reaction—all these should be helpful in diagnosing lues. Rarely have purulent skin infections or eruptions due to bromides and iodides been mistaken for smallpox.

Various immunologic tests may, of course, be employed, but only a few laboratories are equipped to carry them out. The bacteriologic laboratory of the Minnesota State Health Department can perform the following: the chick membrane test, the complement fixation test, and the isolation of the virus. Fluids from vesicles or pustules should be collected in a small capillary tube, which is provided by the Health Department.

Scrapings from macules or scabs should be collected in a sterile vial. Blood in the amount of 7 cc. should be taken as early as possible after the onset of the disease and a second specimen drawn two to four weeks later. In the chick membrane test, the chorioallantoic membrane of fertile hen eggs is incubated. Smallpox and vaccinia produce specific lesions for each, and each virus can be neutralized by specific antisera. Isolation of the virus and a definite rise of the antibody titer in the second blood specimen can be relied upon as diagnostic.

A vaccination test on an unvaccinated person is most helpful, but it is a rather slow process. If the vaccination is carried out after the eruption appears, there will be no "take" in a case of smallpox. A good vaccination scar, especially if it is not too old, speaks much against smallpox. A recent immune reaction practically rules it out.

There is no natural immunity to the disease, although, at times, some immunity is transmitted to the newborn. Various immunologic tests are available to demonstrate immune bodies, and these methods may also be used to demonstrate the identity of the smallpox and alastrim. Some of these tests will be positive also in cases of vaccinia. Occasionally, an immune mother exposed to smallpox may transmit the virus. Although the mother exhibits no symptoms, the baby manifests typical pockmarks. In a case such as this, it appears that the virus, but not the antibodies, passed through the placenta.

Active immunity may be obtained as the result of an attack of smallpox or alastrim by smallpox inoculation or by a primary vaccinia. However, the immunity provided by vaccinia wears off in five to eight years. If prompt vaccinations are carried out at the time of an outbreak of the disease, it should not be difficult to halt its spread. This is because vaccination protects after exposure, but it must be done within one or two days after the exposure. The more time that passes, the less the degree of protection. It has been demonstrated that vaccination reaction after the onset of smallpox is reduced corresponding to the time elapsed since the onset. After four to five days, no reaction can be expected. Passive immunization with immune serum is theoretically possible but impractical.

The unmodified disease's mortality rate varies obviously with the type of epidemic, but it ranges from 20 to 50 per cent and may go even higher. People of the dark races seem to be prone to contract severe cases, and, hence, mortality is somewhat higher among them. Alastrim and varioloid have practically no mortality.

Death usually is caused by an overwhelming toxemia or by complications, such as pneumonia, erysipelas, or sepsis. Among unfavorable factors are pregnancy, alcoholism, and the age factors of infancy and senility. It frequently happens that outbreaks, although fatal in the beginning, tend to become milder as time goes on. It must also be remembered that the course of the disease within a single individual depends on whether he ever was vaccinated and, if so, how long ago. It is generally accepted that a vaccination twenty years old or older scarcely modifies the disease. But protection with vaccination can be clearly proved. During the Minnesota epidemic of 1924 and 1925, only the smallest percentage of the fatal cases had been vaccinated and, in these, the vaccination was at least a quarter of a century old.

Prophylaxis with vaccination is so generally accepted that it is scarcely necessary to comment further. It may be well, however, to again raise the question of whether the usual single vaccination or the multiple vaccinations—as carried out in many European nations—should be done. Which of the two techniques is the better? In normal times and situations, the single vaccination seems perfectly adequate. It may be repeated as many times as necessary if there is no "take." But the picture changes in times of epidemics or after exposure to the disease. Under these circumstances, it would seem advisable to vaccinate in 2, 3, or even 4 places in order to gain assurance of a good reaction. In the case of exposure to smallpox, it seems both sensible and advisable to use a different material for each of the multiple vaccinations. This is insurance against an impotent virus lymph. It must be remembered also that, after exposure, only a prompt "take" before the end of the incubation period really provides protection. The reason for immediate vaccination is clear when it is recalled that the average incubation period runs about twelve days and that it takes about nine days to develop a full-blown vaccinia. In the event that too much time has elapsed after exposure to expect much help from vaccination, it seems advisable to try immune globulin in large doses.

TREATMENT

No great progress has been made in the actual treatment of the disease since early times. There is no specific drug to which the virus is sensitive. The antibiotics seem promising in the prevention or treatment of complications, especially those of streptococic origin. General treatment is directed toward making the patient

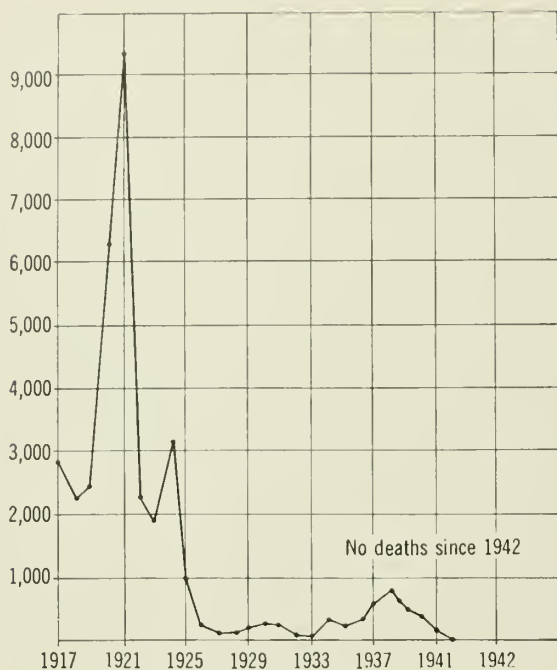


Fig. 1. Cases of smallpox in Minnesota, 1917-1941. The highest incidence during this period was in 1921 when 9,375 cases were reported. However, there were only 25 deaths during that year. In 1924, when there were 3,125 cases, there were 307 fatal cases.

as comfortable as possible, maintaining his strength, and relieving pain, restlessness, and itching. Nursing care, therefore, is of the utmost importance. Sedatives are usually necessary from the eruptive stage on. Continuous baths have been found helpful in confluent cases. Baths or compresses of weak antiseptics should be used in the stages of pustulation and throughout the following period of scab formation. The body may have to be protected by cradles from clothes and bedcovers. During the late stage of pustulation, special care is needed, for, at this time, foul odor from discharging pocks is most trying to both patient and nurses. The question of how permanent scarring may be prevented always has been of greatest significance. All types of antiseptic ointments, powder lotions, and antibiotics have been tried. These agents should be used if only to relieve itching and secondary infections, which, no doubt, are contributory factors in the development of pockmarks. They should be used even though it is recognized that deep lesions will result in scarring even without the presence of an actual secondary infection.

Other portions of the body also demand attention. Care must be given to mucous membrane lesions of both mouth and pharynx. Gargles and

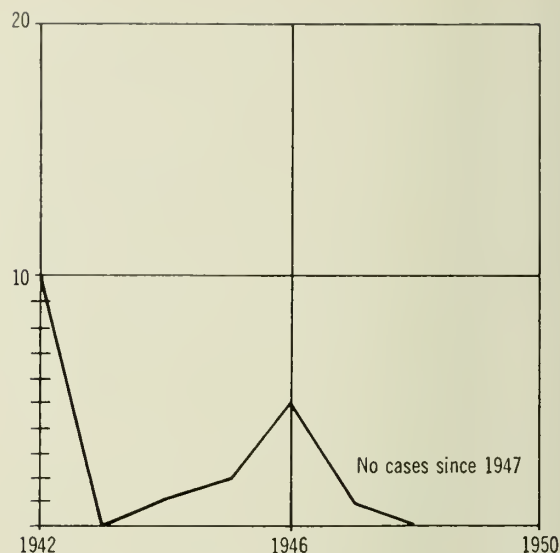


Fig. 2. Cases of smallpox in Minnesota, 1942-1958. There were 10 cases in 1942, none in 1943, only 1 to 5 per year from 1944 to 1947, and none since.

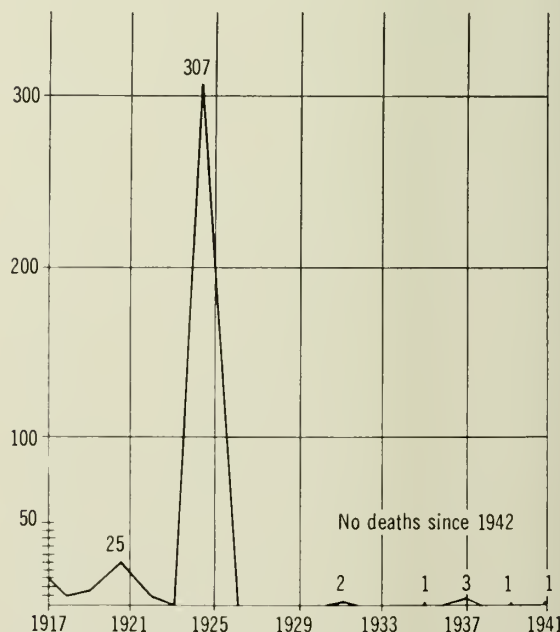


Fig. 3. Deaths from smallpox in Minnesota, 1917-1958. Since 1926, deaths have been reported only every five years, and only 1 to 3 per year occurred. No deaths have occurred since 1942.

mouth washes will prove helpful in clearing ulcers or, at least, in cleansing and relieving bad odors and taste. The eyes demand constant and particular care. In addition to use of mild eye-washes, a mild antiseptic ointment should be put on the lids. It is necessary to maintain the patient's general condition, for it must be remem-

bered that throat and mouth lesions make ingestion most painful. In addition, widespread skin lesions and septic complications may make the introduction of intravenous fluid and food very difficult. General care, of which the nutritional upkeep is part, often may be the deciding factor in severe cases. As anemia is frequently present during convalescence, care must be taken to counteract it.

Prophylaxis is still the most important factor in smallpox—general vaccination before exposure and as protection after exposure. As indicated earlier, vaccination after exposure should be done within twenty-four hours. If done later, but within four days after exposure, modified smallpox can be expected. There is not the slightest doubt that the disease can be kept in abeyance by continued general vaccination. Graphs tracing the occurrence and mortality in Minnesota from 1917 to 1958 (figures 1, 2, and 3) show dramatically the beneficial results that a stepped-up program of immunization can bring. The great epidemic of 1924 and 1925 brought an extensive vaccination program into existence, which gave Minnesota a period of relative freedom from the disease. Again and again, it has been demonstrated that only a program of prevention by means of vaccination can keep small-

pox under control. This means constant, everlasting vigilance and education. Smallpox, it has been said, has not become extinct in Minnesota—it is only being held at arm's length.

The disease is the same today as it was when it swept the peoples and plains and towns of ancient China long centuries ago. The change has come in the social thinking of man, who now knows that vaccination can and does prevent the ravages which the disease, through long generations, has inflicted upon the peoples of the world.

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A Bipolar Myocardial Electrode for Complete Heart Block

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COMPLETE HEART BLOCK consists of three main types. The first type, congenital heart block, requires no treatment but does require careful evaluation to rule out the associated intracardiac or extracardiac shunts which are found in approximately 25 per cent of cases. The second type is produced by intracardiac surgery and needs immediate and sometimes prolonged therapy. The third, the acquired type, is brought about by ischemia of the tissue in and around the conducting system of the heart or an infectious process in or around the bundle of His. If the third type produces complete auricular-ventricular dissociation, vigorous supportive therapy is usually necessary to maintain adequate cardiac output.

Therapy of the second and third category heart block varies from simply limiting the patient's activities, to the administration of drugs, and, finally, to the use of artificial pacemakers. For surgically induced complete heart block, Weirich and associates¹ have described a unipolar electrode placed in the musculature of the right ventricle. This technic has been pioneered by and used with notable success by the University of Minnesota group.

The unipolar myocardial electrode presents problems, however. The conventional pacemaker as produced by Medtronic, Inc., of Minneapolis has been designed to deliver a maximum current of 40 ma. across a resistance of 100 ohms. The unipolar myocardial electrode method with the indifferent subcutaneous electrode will, because of the nature of the circuit, dissipate the current delivered by the transistor pacemaker. This, therefore, will give a lower current density at the critical point (the excitable myocardium)

which surrounds the cardiac electrode (figure 1). This effect, in turn, requires that the transistor pacemaker deliver more amperage to maintain the minimum required current to initiate the heart beat. In addition to the current dissipation effect of the unipolar method, the output must be increased to overcome the reaction produced around the electrodes. This reaction occurs primarily at the subcutaneous or indifferent electrode. The problem is circumvented somewhat by moving the indifferent electrode to a fresh area, but this only reduces the resistance. The current required to drive the heart may reach a level which produces skeletal muscle twitching and, therefore, prove intolerable to the patient suffering with complete disruption of the auricular-ventricular conducting system following either cardiac surgery or myocardial infarct. For this reason, it seemed feasible to explore the bipolar myocardial electrode method.

METHOD

Two stainless steel electrodes 1.5 cm. apart are imbedded in a 1.5 by 2.5 cm. silastic silicone patch (figure 2a and b). A coaxial wire conducts the current to the electrodes. Dogs weighing 20 to 30 lb. are anesthetized with 2.5 per cent Pentothal Sodium. Controlled intratracheal respiration permits right thoracotomy. The silicone patch with the bipolar electrodes is attached to the epicardium of the right ventricle and the coaxial lead is brought out to the external chest wall where it is attached to the terminals of a Medtronic transistor pacemaker (figure 3). Representative graphs of the resistance encountered and amperage required to drive the heart of dogs are shown in figure 4. Since the resistance is not affected whether or not the animal's heart is blocked, these long-term procedures were carried out on a dog without a heart block. The unblocked dog heart can be overdriven by the conventional pacemaker by the bipolar technic for as long as five to six months. On the other hand, the unipolar technic requires

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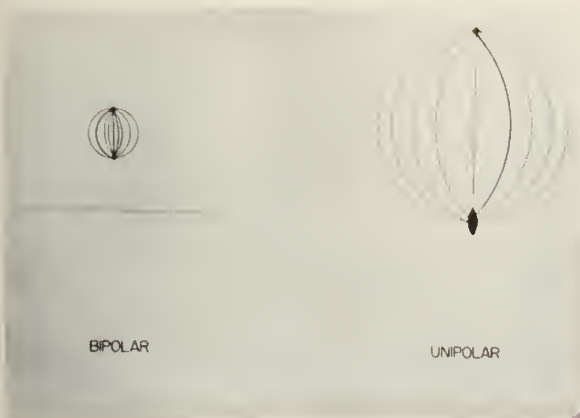
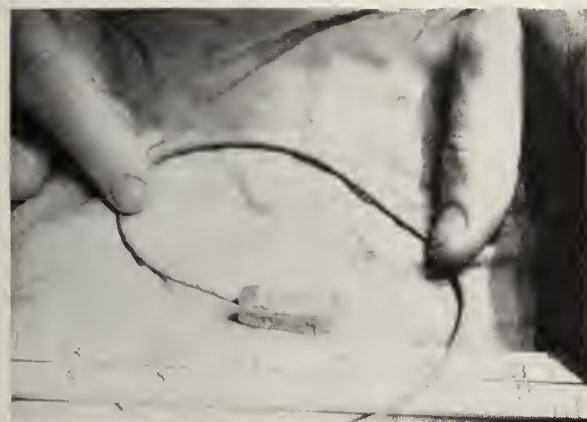
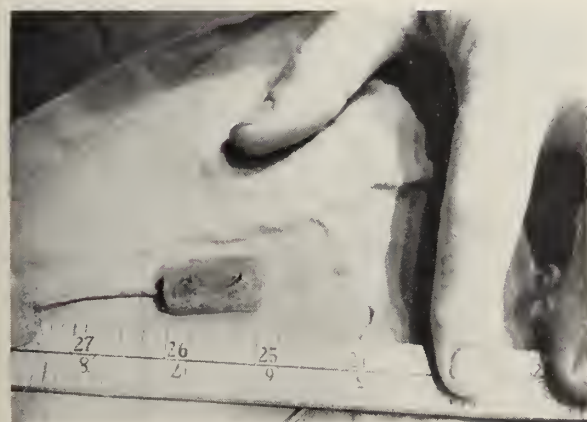


Fig. 1. Graphic representation of electrical lines of force in the bipolar and unipolar electrodes on the heart. Note concentration of amperage using bipolar method as compared to dispersion effect of unipolar method.



(a)



(b)

Fig. 2. Silastic silicone patch. (a) Side view. Note 2 stainless steel electrodes protruding from the mold. (b) Front view.

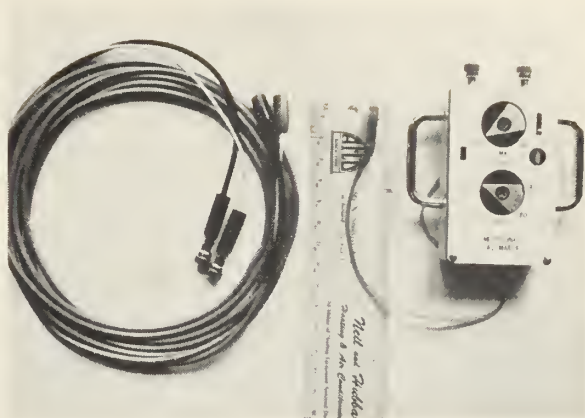


Fig. 3. Composite view of entire electronic equipment needed for placement of bipolar myocardial electrode.

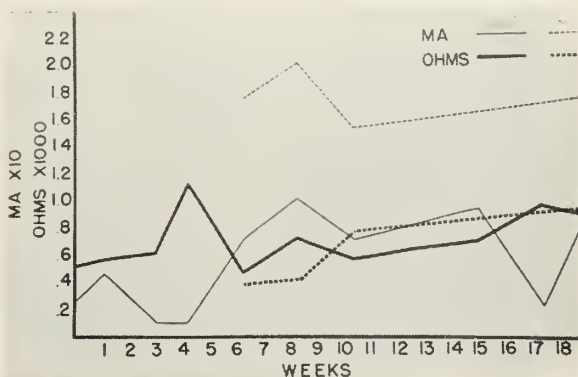


Fig. 4. Graph showing resistance encountered and amperage required to drive the heart using the unipolar and bipolar methods. Note that an average of 17 ma. is required to drive the heart using the unipolar method as compared to 6 to 7 ma. using the bipolar method. Note also that the resistance in both methods averages about 500 to 600 ohms.

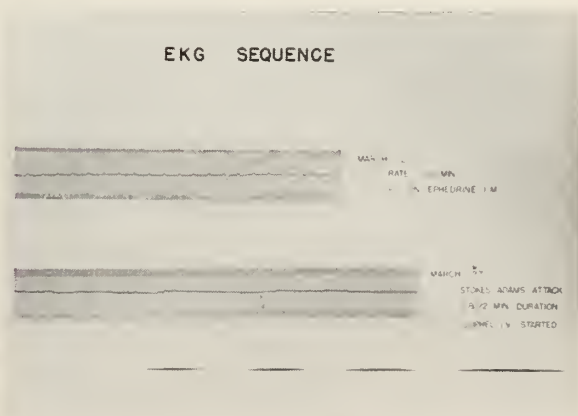


Fig. 5. Electrocardiogram on March 27 showing ventricular rate of 20 per minute. Patient was having black-out spells while in bed. Stokes-Adams attack shown on lower electrocardiogram lasted two and one-half minutes.

an additional power driver after six to eight weeks.

There are two basic points to be emphasized. First, the resistance between the two electrodes on the heart reaches a plateau at approximately 500 to 600 ohms (figure 4). This fact has been borne out over a period of three months with measurements taken at weekly intervals. Second, since the two electrodes are in juxtaposition, the current density across the electrodes is great and is concentrated at the point where it is needed to initiate the heart beat, and the current output, or amperage, can be reduced to approximately 70 per cent of the unipolar technic. Since less current is required by the bipolar technic, skeletal muscle irritation is avoided. This effect has been quite noticeable in the animal experiments. The bipolar effect becomes more and more important in the prolonged surgically induced heart block or the intractable acquired heart block of myocardial infarction.

Substantial evidence indicates that myocardial infarction complicated by auricular-ventricular block produces a greater morbidity and mortality.² Mintz and Katz³ found 100 per cent mortality when complete heart block complicated myocardial infarction. It is conceivable that a bipolar myocardial electrode could be attached to the epicardium of a patient with this treacherous combination. The operation requires very little time. The anesthetic plane need not be deep, and muscle relaxation need not be prolonged beyond tracheal intubation. The aversion to foreign bodies of any kind on the heart has been overcome by the successful use of Ivalon patches to repair cardiac defects. Indeed, the recent use by Vineberg and Deliyannis⁴ of patches of Ivalon for coronary insufficiency itself lends more support to the feasibility of such a procedure. In the permanently blocked heart following heart surgery, this technic offers a method of obtaining prolonged artificial stimulation.

The following case illustrates the clinical use of the bipolar electrode.

CASE REPORT

W.M. is a 72-year-old man who suffered a bleeding duodenal ulcer which provoked a myocardial infarction which, in turn, produced complete heart block. The ventricular rate varied between 16 and 36 per minute. He sustained one attack of complete ventricular standstill (Stokes-Adams disease) for a period of two and a half minutes (figure 5). In one twenty-four-hour period, he had over 40 convulsions with varying periods of cardiac standstill. Fourteen days after the onset of the infarction, the patient was taken to the operating room where a bipolar patch, as described, was stitched

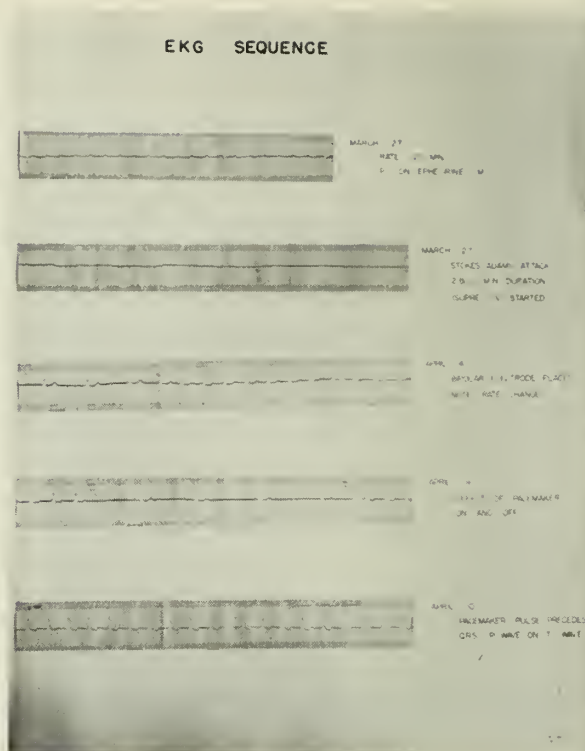


Fig. 6. Electrocardiogram taken on operating table April 4. Note effect of pacemaker on and off. Electrocardiogram taken April 10 shows pacemaker impulse immediately preceding QRS complex.

to the right ventricle. The heart responded immediately to artificial stimulation (figure 6). It must be emphasized that a thorough medical regimen was carried out prior to surgery, yet the patient's condition deteriorated daily. Immediately after placement of the patch, the heart rate was set at 80 to 90 per minute. The blood pressure stabilized at 110/70. The patient responded well after surgery and, though he suffered some cerebral damage which has left his left leg weak, he is now almost completely recovered. The heart rate remains at 84 per minute. His blood pressure is 110/70, and he seems quite content to wear the small transistor on his vest.

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Extracardiac Factors in Cardiac Disease

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A GREAT MANY extracardiac conditions express themselves in whole or in part through the cardiovascular system. These symptoms may be so great that they overshadow the basic symptoms of the original extracardiac disease, and, thus, this basic condition may be overlooked. In many instances, the correction of these extracardiac diseases will bring about a complete relief of the cardiac symptoms and, in other instances, a complete resolution of the cardiac problem. Hearts that are diseased but perfectly compensated may fail when extracardiac disease places a burden upon them. This may precipitate very severe cardiac discomfort and congestive heart failure. The recognition of these extracardiac influences is extremely important in the management and control of heart disease.

Obesity is a very common extracardiac condition that may affect the heart. The extremely obese patient very frequently complains of palpitation, precordial distress, and shortness of breath. Physical examination often reveals a mildly elevated blood pressure, peripheral edema, and a basal systolic murmur. The electrocardiogram shows inversion of both the T wave and the QRS complex in lead III, and, occasionally, a Q wave may be present in lead III. The fluoroscopic examination as well as the x-ray films of the chest reveal that the heart is displaced upward and to the left. These signs and symptoms, as well as physical findings, are the result of the patient's excess weight and the burden placed upon the heart by the increased blood volume. These symptoms cause discomfort in the person with a normal heart and, in the individual with a previously diseased heart, may be the factors that precipitate severe heart difficulty. This process is reversible if the patient

loses weight. In a second form of obesity, the heart itself plays a distinct role in the production of heart failure. Normally, the right side of the heart contains more adipose tissue than the left side. Upon occasion, this adipose tissue in the heart may increase in the same degree that it increases elsewhere in the body. This results in a mechanical disturbance of the right heart and can bring about congestive heart failure. These patients have the characteristic signs of right heart disease. Since the infiltration responds to general dietary measures, it, too, is a reversible process. In extremely obese patients, there may be hypoventilation with associated hypoxia. This leads to polycythemia, and a cycle is established which ultimately leads to pulmonary hypertension with cor pulmonale on the basis of the hypoventilatory function. These patients respond to satisfactory dietary management.

Fatty metamorphosis can occur within the heart muscle in patients who are toxic or anemic or who are suffering from chronic infectious states. In such cases, the lipids increase in the cells to such an extent that they interfere with the function of the cells, and heart failure develops. If the factors producing fatty metamorphosis are curable, these processes are reversible.

Anemia may also play an important role in heart failure. Acute blood loss expresses itself as cardiovascular collapse. In acute blood loss, a systolic murmur may be heard; the heart rate is very rapid; and the blood pressure is low. These findings disappear with restoration of the blood volume.

In the chronic forms of anemia, both systolic and diastolic murmurs or a systolic murmur alone may be heard over the pulmonic artery area. Cardiac hypertrophy may be present. The electrocardiographic findings are not specific. If treatment can be directed toward the under-

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lying cause of the chronic anemia, the restitution of the blood volume will cause these signs to disappear. In patients who have pre-existing heart disease, the appearance of even a slight degree of anemia may be sufficient to precipitate severe cardiac distress. This is particularly true in chronic coronary disease, when the development of an anemia may be the exciting agent in causing severe anginal pain. If the coronary sclerosis is mild, ordinary exertion causes no pain but the combination of decreased blood flow and decreased oxygen-carrying capacity of the blood is sufficient to produce intractable angina. The same applies to individuals who have other forms of heart disease. The hypoxia resulting from the anemia may precipitate congestive heart failure, and only the restoration of the blood volume will bring relief.

Vitamin deficiencies, particularly vitamin B, produce changes in the heart. In individuals who are malnourished as a result of chronic, wasting disease; self-inflicted starvation; or alcoholism and the like, beriberi heart disease may appear. This should always be suspected in cachectic individuals with heart failure or in those with heart failure who are obviously alcoholics. These patients fail to respond to digitalis therapy but make a startling response to vitamin B or to the simple addition of multiple vitamins to the diet.

Endocrine disturbances are often associated with changes in the cardiovascular system. Addison's disease is accompanied by hypotension, a small heart, and the usual signs of peripheral collapse. Replacement therapy with saline infusions, and so forth, will completely reverse the symptoms. Hyperfunction of the adrenal gland in the form of pheochromocytoma or aldosteronism is manifested by hypertension and often electrolyte imbalances. The recognition of these syndromes and the surgical correction of the defect brings about a complete cure.

Hyperthyroidism may manifest itself in the form of simple tachycardia, atrial fibrillation, extra systolic arrhythmia, or paroxysmal attacks of atrial fibrillation or tachycardia. Patients with masked hyperthyroidism may be hypertensive, and they may be dyspneic because of the increased demand for oxygen. Here, again, the recognition of the hyperthyroid state and its correction will relieve the symptoms. In patients with pre-existing heart disease, cardiac failure may develop as a result of mild hyperthyroidism. Correction of the hyperthyroid state will relieve the exaggeration of the pre-existing cardiac condition.

Hypofunction of the thyroid gland can also

cause heart disease. Myxedema is not uncommon. The symptoms are manifold, but those related to the heart are angina pectoris and electrocardiographic changes of low voltage throughout the record. There is also an elevation of the blood cholesterol and often hypertension. Thyroid extract will relieve the symptoms. In an individual with pre-existing heart disease, myxedema may be the precipitating factor causing the heart difficulty, and relief of the myxedema will relieve the cardiac problem.

Hypertension is well recognized as a symptom and not a disease. Certain forms of hypertension can be corrected by surgical procedures. These forms include hypertension associated with a coarctation of the aorta, arteriovenous fistula, unilateral renal disease, and pheochromocytoma.

Pericarditis is not uncommon. The acute forms of pericarditis are found in acute infections or may be the result of trauma. A rapid elevation of venous pressure, decreased pulse pressure, and specific changes in the electrocardiogram are symptoms that will lead to diagnosis. The heart tones disappear. The relief of the acute tamponade brings the heart to normal. Chronic pericarditis often mimics cirrhosis of the liver. The heart is usually small, venous pressure is elevated, the pulse pressure is small, and the heart is silent. There is a small peripheral pulse. On physical examination, murmurs are seldom heard. A fluoroscopic examination of the heart reveals that cardiac pulsation is absent. The electrocardiogram shows low voltage with varying T wave changes. Here, again, ascites is almost always present. Excision of the pericardium brings about relief of symptoms.

Pulmonary changes can influence the heart. Acute pulmonary infarction or multiple embolic phenomena to the lung may cause transient pulmonary hypertension associated with right heart strain. The patient complains of severe chest pain and is in a state of collapse; he is dyspneic and often cyanotic. The symptoms can be confused with those of coronary thrombosis. The electrocardiogram shows a characteristic pattern of acute right heart strain, and treatment directed toward the relief of the symptoms and prevention of other embolic phenomena will cure the condition.

Chronic cor pulmonale can sometimes be corrected, particularly those forms associated with malformations of the chest. The chronic form of cor pulmonale should be suspected in any individual with chronic lung disease. The sudden occurrence of dyspnea out of proportion to the physical findings should also suggest cor pulmo-

nale. The venous pressure is elevated, the pulmonary second sound is accentuated, and the right heart is enlarged. The electrocardiogram shows right axis deviation and hypertrophy with or without right heart strain. Supportive and definitive treatment directed toward the heart and lungs will relieve the patient.

Surgical correction of congenital and acquired cardiac and vascular defects are now common. The surgical treatment of injuries to the heart

and vessels is feasible, and, finally, tumors of the heart are often amenable to surgical intervention.

SUMMARY

When confronted with a cardiac patient, we must determine whether the condition is aggravated or caused by extracardiac factors burdening the cardiovascular system. If so, treatment directed toward the extracardiac condition may relieve or reverse the cardiac distress.

OPERATIVE RISK is not increased by organic heart disease that moderately limits physical activity. Hypertension per se is not a hazard, but associated pathologic changes may be. Coronary atherosclerosis should be suspected in every adult with diabetes, hypertension, or myxedema. Operative risk is greatly increased when coronary ostial stenosis is associated with syphilitic aortitis.

When attacks of angina are increasingly frequent, occur at rest, or do not abate quickly upon administration of nitroglycerin, coronary thrombosis may be imminent and operation should be postponed. Acute coronary occlusion and acute myocardial infarction are contraindications to surgery, although operation is permissible in a patient with healed infarction of one and one-half to four months' duration and no sclerosis of other coronary vessels.

Decision for or against operation depends upon the degree of chronic disability, the improvement during medical management, and speed of deterioration of the patient's condition. The best candidates are persons in class III of the American Heart Association's classification of functional capacity or those in class II who are rapidly approaching class III.

Although nonorganic arrhythmias are harmless, those due to organic lesions should be controlled and the ventricular rate brought within normal limits with digitalis and supportive measures. If unconsciousness accompanies heart block, only the most urgent operations should be scheduled.

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Diagnosis and Treatment of Subacute Bacterial Endocarditis

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WITH THE ADVENT of potent antimicrobial agents, the course of subacute bacterial endocarditis has changed from that of almost inevitable death to recovery in the majority of instances. Early recognition, establishment of an etiologic diagnosis and administration of specific antibiotics in adequate dosages are consequently of prime importance, for, without attention to these factors, the prognosis remains as hopeless as before.

ETIOLOGY

Seventy-five to 80 per cent of cases of bacterial endocarditis are caused by the *Streptococcus viridans*. Group D streptococci (enterococci) are seen in 5 to 15 per cent of the cases. Staphylococci (micrococci) of the aureus and albus strains account for only a small percentage of cases but are more frequently seen than a few years ago, most of them being hospital-acquired and penicillin-resistant. Other organisms occasionally responsible for this disease are pneumococci, gonococci, meningococci, *Aerobacter aerogenes*, and *Pseudomonas aeruginosa* as well as yeasts and fungi, particularly *Candida albicans*.

PATHOGENESIS

The nidus of infection is generally on a valve previously damaged by rheumatic fever, most commonly the mitral valve. More rarely, other conditions, such as syphilis, congenital heart disease, and arteriosclerosis, provide sites for the development of infectious endocarditis. Extensively damaged valves are less frequently affected than those with minor deformities. Living organisms circulating in the blood stream are phagocytized normally by the reticuloendothelial system. Alteration of blood supply to a damaged valve as well as the roughened valve surface appear to predispose to the implantation of

these circulating bacteria, particularly when they are present in large numbers. Platelets and fibrin are added, forming vegetations in which grow nests of live organisms. Phagocytosis cannot occur in the outer, relatively avascular portions of the vegetations. The bacteria thus survive and multiply, except when adequate blood levels of bactericidal drugs are obtained. Friable fragments of these vegetations are easily dislodged and are carried freely to any part of the body. They then do damage primarily by mechanical embolic occlusion, although metastatic abscess formation in the spleen and other organs is occasionally seen. Splenic infarction and enlargement are the rule. Focal glomerulonephritis secondary to repeated embolization is not uncommon and may terminate in irreversible renal insufficiency.

DIAGNOSIS

The classic diagnostic triad is that of heart murmur, fever, and anemia. The diagnosis should always be suspected in persons with known heart disease accompanied by a murmur, persisting fever, splenomegaly, hematuria, clubbing of the fingers, fatigue, anorexia, weight loss, or arthralgia.

Persons with known rheumatic or congenital heart disease in whom chills or persistent fever develop after dental extractions, urologic instrumentations, or intestinal surgery should be investigated for endocarditis.

Embolic manifestations are frequent, the clinical findings being dependent upon the location of the occluded vessel. The organs most frequently involved are the spleen, kidney, and brain. A palpable spleen is present in over 60 per cent of the cases. Splinter hemorrhages are said to be characteristic of endocarditis, but they occur also in persons with uninfected mitral stenosis, in those who have suffered recent major arterial emboli, and, occasionally, in apparently healthy individuals. Such hemorrhages are believed to be due either to minute emboli or to toxic damage to capillary walls. There has

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been speculation as to the correct thesis. Splinter hemorrhages are generally 1 to 3 mm. in length, linear, and longitudinally situated beneath the distal third of the nail. They do not fade or disappear spontaneously but grow out with the nails and can eventually be cut off. The capillary fragility as measured by the cuff test is no greater in patients who have splinter hemorrhages than in other persons. It seems more reasonable to believe that splinter hemorrhages are due to emboli in the terminal vessels of the nailbed, but it is not well understood how they grow out with the nails and become embedded in the avascular squamous epithelium on the undersurface of the nail.

Neurologic manifestations are varied, ranging from mild confusion to hemiplegia. It is not unusual, therefore, to see an occasional patient with bacterial endocarditis initially admitted to a psychiatric or neurologic ward.

The atypical and frequently confusing picture of endocarditis in elderly persons is noteworthy. A heart murmur is easily explained as being due to aortic ectasia and a low grade fever as being caused by an intercurrent respiratory infection. Only a minority of cases of subacute bacterial endocarditis in the older age groups show the clinical picture commonly associated with the disease. It is probable that the disease simply accentuates existing pathologic processes not present in a younger group.

The common physical signs are sometimes transient. Serial examinations do much to enhance the opportunity of detecting important signs, such as petechiae, transient heart murmurs, or the changing character of persistent murmurs. Clubbing can occur with or without the tender subcutaneous nodules of the fingers or toes known as Osler's nodes.

LABORATORY STUDIES

The clinical laboratory adds much of value to the diagnosis of this disease. Important findings contributing much to the diagnosis are a moderate neutrophilia; a normochromic normocytic anemia; an elevated sedimentation rate; an increased serum globulin with reversal of the albumin-globulin ratio; microscopic hematuria, which occurs in 50 to 80 per cent of the cases; and albuminuria and a blood culture positive for the offending organism, which occurs in 75 to 90 per cent of the cases. Seldom, however, are all of these laboratory abnormalities present simultaneously.

Several blood cultures should be taken before instituting therapy. The schedule for obtaining blood cultures is dependent in part on the clin-

ical picture. When there is no clinical urgency, the blood should be cultured 2 to 4 times a day for three to four days. When it is mandatory to commence treatment quickly, the cultures should be obtained hourly for four to six hours and the therapy begun. The cultures should be saved for two to three weeks before being discarded as negative. In determining bacterial sensitivity to the various antibiotics, the serial dilution method is preferable to the disk method.

DIFFERENTIAL DIAGNOSIS

The diagnosis of bacterial endocarditis in its typical form ordinarily presents no problem. It may, however, at other times simulate a variety of entities. It can be a complex diagnostic problem in elderly persons, particularly when the temperature is normal. For all practical purposes, the diagnosis can be excluded in the absence of a heart murmur, although, in rare instances, a murmur will not be heard at any time during the illness. Among the diseases most likely to simulate bacterial endocarditis are miliary tuberculosis, Hodgkin's disease, disseminated lupus erythematosus, acute rheumatic fever, brucellosis, periarteritis nodosa, glomerulonephritis, and primary cerebral vascular accidents. These conditions must be carefully considered before a diagnosis is made.

TREATMENT

The importance of identifying the causative organism and determining antibiotic sensitivity cannot be overstressed, for a cure depends primarily on the proper choice and use of antibiotics. When the causative organism cannot be determined, the therapy must be based on an intelligent guess as to which organism is the most probable. It may then be necessary to change the treatment regimen empirically if the results of therapy fall short of those expected. The therapeutic results in such cases are less satisfactory than they are when the organism can be identified.

When the causative organism has been isolated and its sensitivity to antibiotics determined, specific therapy is begun. Finland¹ recommends the following antibiotics and dosage schedule:

1. For streptococci of the viridans group sensitive to 0.1 unit per cc. or less of penicillin: 600,000 units of penicillin given intramuscularly every six hours for two weeks plus 1 gm. of streptomycin administered intramuscularly every twelve hours for one week and then once daily for one week.

2. For streptococci of the viridans group requiring 0.2 units per cc. or more of penicillin: 1 million units of penicillin given intramuscularly every two or three hours for two or three weeks plus 1 gm. of streptomycin every twelve hours for two or three weeks.

If greater resistance is shown by the serial dilution test, a longer schedule of treatment must be carried out. Penicillin levels have been shown to be better maintained if probenecid is added orally in a dosage of 0.5 gm. every six hours.

3. For enterococci: penicillin dosage varies with organism susceptibility.

Minimum dosage should be 1 million units administered intramuscularly every two or three hours for six weeks. Up to 20 million units daily by constant intravenous infusion might be required. Streptomycin should be added in a dosage of 1 gm. every twelve hours for the first three weeks and then once daily for three weeks.

4. For micrococci sensitive to 1 unit per cc. or less of penicillin: 1 million units of penicillin given intramuscularly every two or three hours plus 0.5 gm. of probenecid administered orally every six hours for six weeks.

5. For micrococci (staphylococci) resistant to 1 unit per cc. of penicillin, one of the following combinations should be used: (a) Erythromycin plus either bacitracin, streptomycin, chloramphenicol, or one of the tetracyclines, (b) Novobiocin plus bacitracin, streptomycin, or a tetracycline, or (c) Chloramphenicol plus bacitracin or streptomycin.

The treatment is continued for six weeks. The parenteral route is generally used for the first three to seven days. The antibiotics are administered in their maximum tolerated dosages. Weber² recently reported encouraging results with ristocetin (Spontin) in the treatment of staphylococcal endocarditis.

6. For group A hemolytic streptococci, pneumococci or gonococci: 600,000 units of penicillin are given intramuscularly every six hours for three weeks.

For information regarding maximum tolerated dosages of the foregoing antibiotics as well as for recommendations regarding therapy for some of the less common organisms, the reader is referred to Finland's¹ excellent article.

Geraci³ recommends the following additional principles of treatment of bacterial endocarditis:

1. Question the patient regarding drug allergy and toxicity. Observe reactions during treatment. Check renal function before treatment.

2. Obtain dental roentgenograms and examine the patient early in treatment. Do extractions while patient is under antibiotic coverage!

3. Insist on sufficient rest for one month after treatment is concluded. This is particularly important if treatment has been carried out over a short, two-week period of time.

4. Do not give anticoagulants because of the danger of cerebral hemorrhage.

5. Use supportive therapy, regimen for congestive failure, and blood transfusions if necessary.

6. Provide for adequate monthly examinations for three months to check for relapse.

7. Evaluate extent of damage to heart from infection. Repeat roentgenograms of the chest after treatment has stopped.

8. Advise patient concerning antibiotic prophylaxis for the future. Selected antibiotics should be adminis-

tered before and after dental extractions, urologic instrumentations, or intestinal surgery. Continuous antibiotic prophylaxis is not necessary.

9. With relapse, treat again for a longer period with larger doses of the same antibiotics as a rule. With reinfection, the same regimen can be repeated.

PROGNOSIS AND COMPLICATIONS

Bacterial endocarditis is a good example of the alteration of the natural history of disease with the use of antibiotics. Prior to the antibiotic era, the disease was almost uniformly fatal. Although the recovery rate now ranges from 65 to 70 per cent, it is apparent that there is still much room for improvement.

The cure of the infectious process does not necessarily solve the problem, however, since the cure is sometimes not accomplished before sufficient valvular damage has occurred to produce progressive cardiac deterioration. Thirty or 40 per cent of successfully treated patients may die later of one of the complications, such as congestive heart failure, renal insufficiency, or cerebral embolism. This again points out the importance of early recognition of the disease and immediate institution of therapy. According to Beeson,⁴ clinical factors which favor a good outcome are in their order of importance: (1) penicillin sensitive organisms, (2) freedom from signs of heart failure, (3) positive blood cultures, and (4) short duration of illness.

CONCLUSIONS

Errors in diagnosis leading to delay in therapy as well as inadequate treatment of patients with resistant organisms are the factors accounting for the majority of failures in subacute bacterial endocarditis. Early recognition coupled with prompt intensive therapy with specific antibiotics can spell optimism in the face of an otherwise hopeless disease. The fact that even today one-fourth or more of the patients with subacute bacterial endocarditis succumb to the disease attests to the need for further progress in its management.

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The Lens: An Oculist's Preoccupation

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IN THE CAMERA-LIKE construction of the human eye (figure 1), two lenses are actually in use to give the eye its optical system. The light ray bending ability is divided between the cornea and the lens. Roughly speaking, our small eyeball, which is less than 1 in. in diameter, needs about 60 diopters of ray bending apparatus to bring the light to a sharp focus on the macular area in the retina. The cornea is by far the most powerful of the two lenses and does approximately three-fourths of the bending, leaving the other one-fourth to the crystalline lens. This makes the cornea equal to approximately 45 diopters and the lens to about 15 diopters.

ASTIGMATISM

Astigmatism is primarily a problem of the cornea. This round, watch-glass appearing surface on the front of the eye may not be perfectly spherical. If it is slightly out of round, the difference of the radii of curvature measured at 90° angles to one another is called astigmatism. This difference of curvature of the two axes can be corrected by a proper cylindrical or astigmatic lens. The condition that I have just spoken about is called regular astigmatism. There is also irregular astigmatism that follows developmental defects, such as keratoconus, or that which follows injuries with cicatricial contraction. This distortion results in very uneven ripples of the cornea, and a trial and error method must be used to select the lens that will provide the patient with the best possible vision.

The crystalline lens. Much more could be said about this interesting lens called the cornea, but I now wish to direct attention to the human crystalline lens. It is ingeniously constructed in the shape of a biconvex spheroid. The lens has many laminations, similar to an onion, and is covered with a capsular skin which completely surrounds it. In early life, the lens is quite homogeneous in its density, but, since no new cells are added from the outside, the only growth takes place in those equatorial cells which suddenly become active underneath the capsule near the equator.

As this cell body grows in an elongated fashion in front and back of the lens, it becomes apparent that the center, or the nucleus, of the lens will be more and more compressed. This increased density also increases the lens' index of refraction. It has been postulated that this increased density in some way counteracts the expected lack of elasticity brought on through the process of presbyopia.

If it is to do a good job, the lens should remain quite clear. It is avascular and derives nourishment from the fluids which surround it. The lens cannot obtain and utilize oxygen like other vascularized tissues. Therefore, it must use a very complicated intracellular oxidation-reduction type of system and use substances which act as hydrogen receptors. This active interchange of oxygen and hydrogen in the lens is aided by such substances as glutathione, cevitamic acid, and riboflavin.

CONCEPT OF THE CATARACT

If we define a cataract as an opacification of the human crystalline lens, we must realize that everybody has a cataract. It is impossible for mother nature to give us an optically pure lens behind our pupil. However, any opacity that actually diminishes vision is called a clinical cataract, and, in an otherwise normal eye, the amount of density and sight of the lens opacity gives rise to varied visual symptoms.

Classification of cataracts. Cataracts are usually classified as congenital, primary, and secondary.

The congenital cataract is present at birth and is usually nonprogressive. It is often accompanied by associated ocular defects, such as nystagmus, microphthalmus, strabismus, amblyopia, and other findings. One is always suspicious of maternal rubella in the first trimester when an infant with a congenital cataract is seen. A differential diagnosis must be made with retrolental fibroplasia, vitreous abscess, optic atrophy, Tay-Sachs disease, pseudoglioma and ocular neoplasms, and retinoblastoma.

The division of primary cataracts usually encompasses almost all of those encountered in geriatric practice. In older classifications, there

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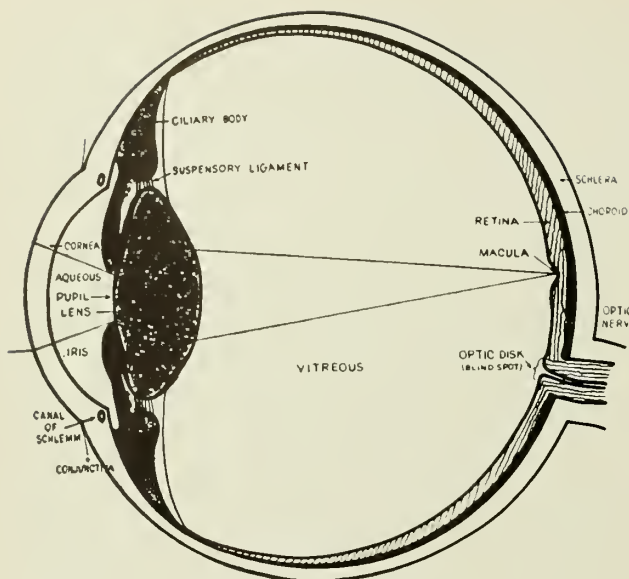


Fig. 1. The human eye

are all degrees of maturity from a slight intumescence to a hypermature Morgagnian cataract in which there is a complete liquefaction of the cortex with a small nucleus at the bottom of the wrinkled capsular bag.

A secondary cataract, of course, is usually due to some easily detected cause. The four principal causes are trauma, intraocular disease, metabolic disease, and toxic entities. In speaking of trauma, we think of contusions; perforations; heat radiations; and, more recently in our atomic age, gamma and x-ray radiations. The most common ocular disease causing a cataract is inflammation or anterior uveitis. Glaucoma, neoplasms, and retinal pathology can also contribute to the lack of lens transparency. The most common metabolic disease is diabetes. Hypoparathyroidism should not be forgotten as well as myotonic dystrophy and atopic dermatitis. The anlage for the lens is surface ectoderm, and cataracts are often associated with people with atopic dermatitis. Toxic materials, such as the weight reducer, Dinitrophenol, which is now banned, and ergot poisons and heavy metals can cause toxic cataractous changes.

MANAGEMENT OF THE CATARACT PATIENT

Diagnosis. The diagnosis of a routine, senile type of cataract is usually made because of the symptoms of decreased vision without history of pain, trauma, or inflammation. The lens opacity can be seen by an ophthalmoscopic reflex. They are more easily noticed with a dilated pupil and can be seen as a white opacity in the pupillary space or as a red reflex obscuration.

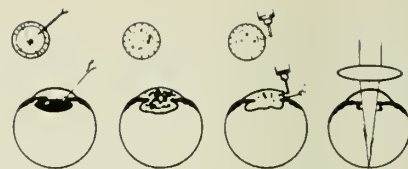


Fig. 2. Linear cataract extraction

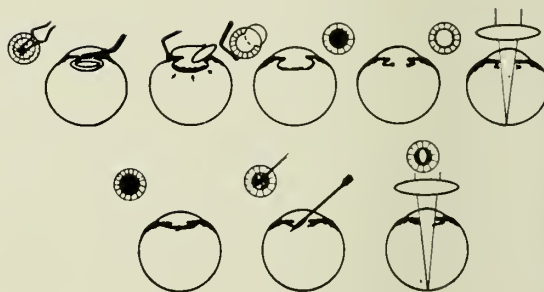


Fig. 3. Extracapsular cataract extraction

The differential diagnosis is very important, because a beautifully performed lens extraction may not result in the expected good vision through failure to recognize another ocular disease. These ocular disorders include an uncorrected refractive error; longstanding amblyopia; macular degeneration; corneal, aqueous, and vitreous opacities; and chronic glaucoma. A retinal detachment, malignancy, central nervous system pathology, and optic pathway disorders as well as various retinopathies can also result in poor vision. The family doctor can rule out most of these disorders by taking a clinical history, making an external examination, and performing ophthalmoscopy and tonometry.

Treatment. In treating a patient with cataracts, three courses can be carried out: psychologic, medical, and surgical.

1. Under psychologic treatment, I would include a very thorough and complete examination, including refraction and an evaluation of the patient's own emotional and mental health. This thorough examination is done to obtain the best possible vision via glasses. It also helps to establish a patient-doctor friendliness and attain mutual confidence and rapport. The doctor can also possibly eliminate misconceptions and correct lay myths. At this point, he can choose the best means of treatment or resort to temporary scientific neglect.

2. Medical treatment of the eye affords three possibilities. The first, of course, is the use of a mydriatic drug. The patient with a nuclear sclerosis and opacity will tell the doctor that his vision is much better because of the wide dila-

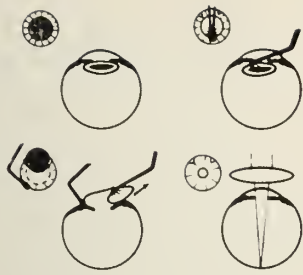


Fig. 4. Intracapsular cataract extraction

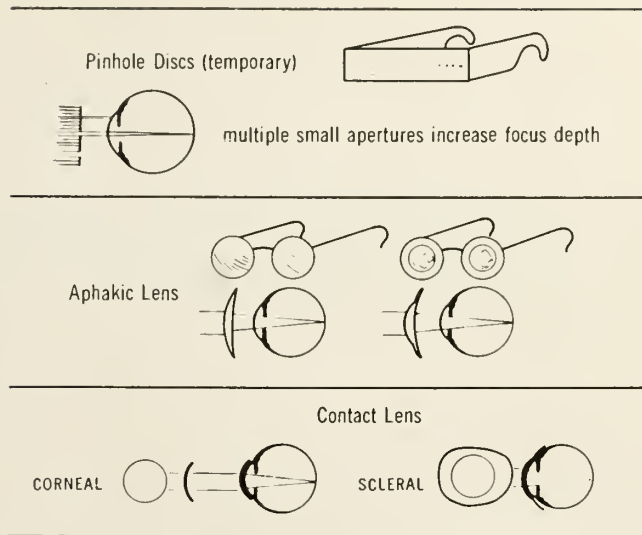


Fig. 5. Cataractous lens substitutes

tion of his pupil in the dim light and subdued illumination. In bright sunshine and under a strong reading lamp, the pupil will contract to the extent that vision is markedly impaired. A mydriatic drug can be given to sensible people for dilation of their eyes providing they are checked constantly to avoid an angle-block glaucoma, which can ensue with dilation. The second type of medical therapy might be called a placebo. A placebo is an honorable prescription. When given correctly, it can be a great source of comfort to the patient. Almost all eye men realize that no eyedrop will prevent a cataract from developing, but if its use encourages periodic follow-up visits and gives mental relief to the patient, I believe that it is worthwhile. The third type of medical therapy, of course, consists of systemic geriatric treatment. This includes well-rounded diets, sensible activities, supportive vitamins, insulin, calcium, special nutrition, and other medicines.

3. Surgical removal of the lens can be performed as a linear, extracapsular, or intracapsular extraction.

Linear. In the linear extraction (figure 2), which is usually done on a congenital cataract, one must remember that the lens cortex is quite homogenous and that a nucleus has not developed as yet. The technic consists of needling or doing a discission of the anterior capsule of the lens. This allows the aqueous to have access to the homogeneous lens cortex. The cortex thus becomes opaque and fluffs into the anterior chamber where it can be absorbed in time, or

the doctor may elect to do a subsequent irrigation of the flocculent material through a small corneoscleral incision.

Extracapsular. The extracapsular and the intracapsular cataract extractions are done in the older age group. An extracapsular cataract extraction (figure 3) is performed by entering the eye and removing the anterior capsule of the lens with a toothed forceps. The nucleus is then expressed through the incision, and the posterior capsule moves up into the pupillary opening and is absorbed. If it does not, a secondary discission or "after cataract" operation can be done. A knife needle is introduced into the eye and a chink is made in this gossamer-like cobweb membrane in order to allow light to enter.

Intracapsular. In the intracapsular extraction (figure 4), both lens and capsule are removed in toto. This is done by gently grasping the lens capsule with a smooth forceps and, with external contrapressure below, the lens is delivered through the incision, leaving no lens substances behind to be absorbed.

SURGICAL ADVANCEMENTS

In recent years, ophthalmic surgeons have had improved preoperative medications and analgesics, tranquilizers, sedatives, and mydriatics. We've had much better anesthesia. Our instruments and technics, with sharper needles, better forceps, and needle holders, are much improved. Early ambulation is the rule in this older group. Only one eye is usually bandaged and the patient is allowed a pillow, regular diet, and bath-

room privileges. The stay in the hospital is usually about one week. The aphakic substances have been improved so that, with an otherwise normal eye, good vision is achieved in a high percentage of cases.

Cataractous lens substitutes. Immediately after the operation, a pinhole disk can be used as a temporary lens, since the multiple small apertures increase the focus depth and encourage the patient and restore some of his confidence. The actual substitution for the removed cataractous lens can be done via an aphakic lens, a contact lens, or an intraocular lens (figure 5). The aphakic lens is the most common, and, with modern lenses of lighter design, the majority of people elect to use this means of correcting their vision. The aphakic vision corrected with spectacle lenses differs from the phakic vision previously enjoyed by the patient in that there is about a 25 per cent magnification with initial subjective proximity of objects. With the lens removed, there is no accommodation and this must be corrected by a proper bifocal segment. There is some distortion and lack of clarity in the peripheral vision, and the patients should be led to expect that the postoperative period of adjustment may take considerable time. As in most things, however, a mature patient will adapt very well and quickly to this "newer" type of vision. Contact lenses are of great value for a very selected minority of aphakic patients. They cause very little distortion and very slight magnification, so that an unoperated eye and an aphakic eye corrected with a contact lens can work together as a team. For those people who wish to try them, the small microlenses are very useful and extremely well tolerated.

Intraocular plastic lenses. Much interest has been shown in the intraocular plastic lenses that have been developed in recent years. In the early 1950's, Dr. Ridley of England placed a plastic lens in the patellar fossa behind the pupil and the normal site of the cataract lens. This was not accepted readily because, from a long-term outlook, the lens implanted in this position is fraught with dangerous potentialities. However, the very delicate, precision-made anterior chamber lenses hold great promise. These are lenses so constructed that they are placed in the aphakic eye three to four months after the operation when the eye is quiet. The lenses are gently wedged in the angle of the eye in front of the plane of the iris and pupil and behind the posterior surface of the cornea. Strampelli of Rome, Barraquer of Barcelona, and Guerry and Lieb of Virginia have used them from two to five years with impressive success.

INDICATIONS FOR ONE-EYED CATARACT EXTRACTIONS

Because it is impossible to make an aphakic eye and a phakic eye work together as a team with conventional spectacles, the possibility of doing a cataract operation on one eye would seem to be out of the question. Occasionally, however, the surgeon will elect to do a one-eyed cataract extraction for some of the following reasons. If the patient has only one eye and a cataract is cutting down vision, the surgeon will often wisely wait until the patient himself elects surgery, since there is no second eye to fall back on in case of a catastrophe. In a two-eyed individual, a cataract operation might be performed if opacification has increased in the better eye since the last visit. It might also be done in the presence of an ocular disease, such as glaucoma following an intumescent lens. Dr. Goar of Texas makes quite a plea for doing a one-eyed cataract extraction if the cataractous eye is developing pronounced exotropia. There is the old axiom, "A blind eye is a deviating eye." It is felt that a cataract extraction of a blind eye encourages a form of single binocular vision even though the operated eye cannot be fully corrected. Occasionally, a patient will elect surgery for cosmetic reasons, for example, if his lens opacities are sufficiently anterior, a chalky pupil may develop. This is a very noticeable condition, and many people have cataract surgery for this reason.

MISCONCEPTIONS REGARDING CATARACTS

Because the cataract entity has been known for centuries, many myths and erroneous beliefs have arisen about it. Common misconceptions include the beliefs that (1) surgery must wait until the cataract is "ripe;" (2) cataracts mean inevitable blindness; (3) using the eyes makes cataracts worse; (4) cataracts can be prevented by taking vitamins, receiving injections of fish protein, or wearing tinted lenses; (5) some eye-drops dissolve cataracts; and (6) "second sight" indicates that a cataract is not present.

Cataracts are now considered to be primarily geriatric problems but conditions which respond well to contemporary management.

If it is true that 85 per cent of our knowledge is gained through our eyes, then this tiny bit of protein plays a key role in our development from the very beginning. In its inexplicable way, this flattened, pea-shaped lens can transmit and bend or obscure and block the entering light rays.

We take our sight for granted, but, when it is affected by a developing cataract, the painless distress experienced has no counterpart in the threatened well-being of any of us.



Notes from a Medical Journey

Lisbon, Portugal
13 September 1959

Dear Jay:

It is only 9:00 A.M. but I am grateful for the lacy shade of a pepper tree that filters the Portuguese sun from my wicker chair in the garden. This is the home of the Leite family whose 17-year-old son, Tony, lived with us last year in Minnesota. I am stopping here twenty-four hours on my way home from another hasty medical journey, mainly to start our new long-time research program on heart disease in rural Finland. Lectures and conferences filled up all free time along the way, and the final high point was a long-awaited wedding yesterday in Rome.

My former student and perennial collaborator in Naples, Flaminio Fidanza, seemingly a hopeless case of misogamy at nearly 40 years of age, finally went to the altar with all the trimmings--church full of flowers, big wedding reception, and the ceremony blessed by a telegram from the Pope. Best of all, the bride seems to have just the right temperament to balance (or control?) Flaminio's exuberant personality. So, Paul Dudley White and I were delighted to stand at the altar as "testimoni" and to sign the legal documents for the marriage of "Fidanza, Flaminio, and Alberti, Adelberta."

Since both families are prominent in the medical world of Italy, the wedding brought doctors and professors from all over the country. The doyen of the throng, Professor Gasbarini, who retired from the chair of medicine at Bologna some years ago, gave the principal toast to the newly-weds. The bride's father, who is a senator of Italy as well as the professor of the history of medicine at Rome, gave a sparkling and erudite response as host. The champagne flowed and my cheeks were lacerated from kissing wire-bearded Italians. But, only the ladies kissed the bride.

Before the wedding, I flew to Geneva with Dr. Vittorio Puddu, secretary-general of the International Society of Cardiology. There we met Paul White and Dr. Pierre Duchosal, vice-president of the society, for

talks with officials of the World Health Organization. We are concerned to have the society apply its good offices in the new orientation of WHO toward cardiovascular and other noninfectious diseases as well as to its original emphasis on sanitation and old-fashioned public health work in the family of nations. The World Health Assembly has directed WHO to get busy in this new direction, including research. In the cardiovascular field, WHO has recently acquired an able young staff member, Dr. Fejfar of Czechoslovakia, but otherwise lacks personnel who know the subject. So WHO must lean heavily on outsiders and cannot, or should not, attempt to leave developments in the hands of public health administrators and statisticians. As you know, I insist on the great value of biostatistics in planning and analyzing research, but I do know also that some statisticians are unaware of their limitations and they are apt to be the most arrogant in their pronouncements and the most forward in attempting to direct research.

Geneva was only exploratory. Later in the month, some of us will meet again in Mexico City with Drs. Ignazio Chavez, Gunnar Björck and others with responsibility in the society to discuss what can and should be done. Besides concern that WHO capitalize on the good will and expert knowledge of the members of the society, my own interest is that both the society and WHO promote the kind of international collaboration in epidemiologic research that engages me so much.

So, tonight I fly home to clear the desk a bit, gather a fresh supply of shirts, and take off for Mexico with Margaret who stayed home thus far to see the children settled in schools and colleges. Anyway, this trip was all work and no play, that is, except for a lot of excellent dinners and good talk after hours.

As usual in Finland, some of the best fellowship was associated with sauna baths. When men share the sauna together, body and mind relax and wit and wisdom as well as perspiration emerge. The weather turned (from about the hottest summer on record) the day after I arrived in Finland, and the north wind turned the water in the gulf upside down. As a result, my sauna that night involved a nice thermal contrast -- 240° F. in the sauna and 40° F. in the water into which we plunged afterward.

My last sauna, a week later, was at a logging camp deep in the Karelian woods 10 miles from the Russian frontier. Afterward, we sat in the camp kitchen and watched in amazement while the forestry superintendent and assistants ate slabs of high fat cheese and ultrathin slices of black bread hidden under a quarter of an inch of butter and washed it down with extra rich milk.

These are representative of the men we found to average 292 mg. of cholesterol per 100 cc. of blood serum. Our host, aged 50 or so, had already had one coronary occlusion, which is considered about "normal" in that part of the world, just as we would accept bifocal lenses at the same age. These are tough men who work hard at everything, including

fighting Russians, and philosophically accept their major health hazards of coronary heart disease and the accidents of their occupation.

Anyway, the research program is going beautifully, mainly thanks to Dr. Martti Karvonen, the tireless support of Professor Paul Soisalo, and Professor Paavo Roine's excellent organization for dietary studies. We are confident that we shall cover at least 98 per cent of all men aged 40 to 59 in the selected region. This will mean about 800 men, and the follow-up over the next five years as well as the prevalence findings in this year's survey should teach us much. An exactly parallel study will start next month in rural West Finland, and all of this work is coordinated with identical programs in rural areas in Italy, Yugoslavia, and Greece.

In between things on this trip, progress is being recorded on forthcoming foreign editions of our book, "Eat Well and Stay Well." Dr. Magnus Pyke is nearly finished with the British adaptation and the Karvonens are not far behind on the translation into Finnish, so both of these editions should be in print before many more months. The Spanish and Portuguese editions are less far advanced. The Italian edition, which I thought would go rapidly with Puddu, Fidanza, and Arrigo Poppi doing the translating, is still in negotiation and nothing definite has been arranged about other translations under consideration -- French, German, Swedish, and so forth. However, it is clear that physicians, their patients, and just plain people in many areas are interested in adjusting the diet to reduce both body fat and blood cholesterol. United States sales of the book are 30,000 plus in the less than six months since publication.

Now the car is waiting for a drive to the seashore and a lobster luncheon. I may write again from Mexico.

As ever,

A handwritten signature in black ink, reading "Ancel Keys". The signature is fluid and cursive, with the first name "Ancel" written in a larger, more prominent script than the last name "Keys".



Moses Barron, M.D.

E. T. BELL, M.D.

Minneapolis, Minnesota

DR. MOSES BARRON was born in Kovno, Russia, on November 8, 1883. When Moses was 3 months old, his father left for America in an attempt to establish himself and send for his family. Moses, his mother, and an older brother were brought to America five years later. His father had bought the rights to a homestead near Herman, Minnesota, in an isolated area. The nearest neighbor was 2½ miles away. Moses began his education in a 1-room schoolhouse, walking 4 miles each way through extreme winter weather which limited the school year to fifty or sixty days. To obtain a certificate for entrance to high school, he was forced to leave his family and attend the eighth grade in Fargo, North Dakota. His grades were maintained at a high level with the exception of penmanship, which still gives him some difficulty.

In 1900, because of extreme financial hardship on the farm, the family moved to St. Paul and opened a grocery store. Moses entered Central High School at this time and graduated in 1903. Following this, he worked in the grocery store for two years to earn enough money to enter college. In the fall of 1905, he enrolled in the six-year medical course at the University of Minnesota. This was the first time that two years of premedical work was made optional. After completing his medical course in 1911, he became the first and sole intern at the University of Minnesota Hospitals. After completing his internship, he spent a year teaching bacteriology and then began ten years of instructing and research in pathology. During this period, he was awarded membership in Alpha Omega Alpha, honorary medical fraternity, and in Sigma Xi, honorary scientific fraternity.

In April 1917, he joined Base Hospital 26 and, in 1918, having been promoted to captain, he was

sent to France, where he became director of the pathology laboratories at the hospital center in Al-lerey. He returned to the United States with the rank of major in the medical corps in April 1919. He then married Leah Fligelman, whom he met at the University of Minnesota before going overseas. In pursuit of his work in pathology, he joined a number of organizations, including the American Association of Pathologists and Bacteriologists, American Association of Cancer Research, and the Minnesota Pathological Society. In 1920, he decided to go into internal medicine and began private practice in Minneapolis in 1921. He continued to teach part-time at the University, giving clinical lectures emphasizing the pathologic basis of disease. In 1926, he spent a year in postgraduate study in the General Hospital in Vienna. He was promoted from assistant professor of medicine to associate professor and finally to professor of medicine in 1933. The latter position he held until his retirement in 1952, when he became professor emeritus of medicine.

Organizations which have particularly interested him are the Central Society for Clinical Research and the American Diabetes Association, of which he is an honorary member. He has been very active in the detection drives of the American Diabetes Association and represents Minnesota as its governor to that body.

In 1948, he was chosen as the outstanding man of the year by the Minneapolis Jewish Community. Dr. and Mrs. Barron have been honored for their work in furthering the cause in Israel by the planting of a forest in their name and the dedication of a hospital to be known as the Dr. and Mrs. Moses Barron Medical Center.

Among some 35 of his medical publications dealing with pathology and clinical subjects was one that

dealt with certain changes in the pancreas, which suggested the possibility of extracting effective insulin. This article was quoted by Dr. Banting in many of his lectures as being the one which inspired him in his research on insulin.

After Mt. Sinai Hospital in Minneapolis was completed, Dr. Barron was appointed the first chief of the hospital staff. At the present time, he is in private practice in Minneapolis and continues to maintain his interest in study and research in diabetes and pathology.

The appended list of publications shows a broad interest in internal medicine and pathology. The publication of which Moses is most proud is No. 10. He described a case of pancreatic lithiasis in which obstruction of the pancreatic ducts had caused complete atrophy of the acinar tissue, leaving the islets intact. This suggested to Dr. Banting a method of getting an extract of the islets free from the proteins of the acinar tissue. Dr. Banting acknowledged his indebtedness to Dr. Barron in a personal letter which follows.

UNIVERSITY OF TORONTO
TORONTO 5, CANADA

November 3rd, 1934

Dr. M. Barron,
1127 Medical Arts Bldg.
Minneapolis, Minn.
U. S. A.

Dear Dr. Barron,

Many thanks for the reprints on "The Relation of the Islets of Langerhans to Diabetes, with Special Reference to Cases of Pancreatic Lithiasis."

As I have so often said, it is through the reading of this article that I obtained the original idea for the isolation of insulin. Unfortunately, I have mislaid my November 1920 number of *Surgery, Gynecology and Obstetrics*, and I am delighted to receive the reprints of your article.

I have just returned from two weeks in the North country, but I will read this article over again with more interest than ever.

I am sorry that you were not at the meetings in Indianapolis, as I would like to have met you.

Again thanking you, I remain,

Yours sincerely,

F. G. Banting, M.D.

The most striking features of Moses' personality are his energy and enthusiasm. He was a very popu-

lar teacher both in pathology and in internal medicine because of his knowledge of the subject and the enthusiastic way in which he presented it. His successful career in clinical medicine is evidence that a background in pathology is helpful to a clinician.

Moses will be remembered kindly by all his former students and colleagues. I am happy to remember the many years of our friendship, and it is my expectation and hope that he has many more fruitful years ahead.

PUBLICATIONS BY MOSES BARRON, M.D.

1. Report of a case in which the fusiform bacillus was isolated from the blood stream (with W. P. LARSON). *J. Infect. Dis.* 13:429, 1913.
2. Teratomata of the brain. *J. Cancer Res.* 1:311, 1916.
3. Carcinoma of esophagus with perforation of aorta. *J.A.M.A.* 67:1585, 1916.
4. Differentiating polychromatic toluidin-blue stain. *J. Lab. & Clin. Med.* 3:432, 1918.
5. Meningitis in newborn and in early infancy. *Am. J. M. Sc.* 56:358, 1918.
6. Pathology of (mustard?) gas inhalation (with G. W. COVEY). *Am. J. M. Sc.* 157:808, 1919.
7. Diphtheria at a hospital center (with G. H. BIGELOW). *J. Infect. Dis.* 25:58, 1919.
8. Necropsy studies at a hospital center. *Arch. Int. Med.* 24:302, 1919.
9. Abnormalities resulting from remains of omphalomesenteric duct. *Surg., Gynec. & Obst.* 30:350, 1920.
10. Relation of islets of Langerhans to diabetes with special reference to cases of pancreatic lithiasis. *Surg., Gynec. & Obst.* 31:437, 1920.
11. Lead poisoning, with special reference to poisoning from lead cosmetics (with H. C. HABEIN). *Am. J. M. Sc.* 162:833, 1921.
12. Carcinoma of the lung; incidence, pathology and relative importance. *Arch. Surg.* 4:624, 1922.
13. Value and importance of blood chemistry in clinical medicine. *Minnesota Med.* 6:238, 1923.
14. Cinchophen poisoning. *J.A.M.A.* 82:2010, 1924.
15. Diseases of the pancreas. *Arch. Int. Med.* 35:807, 1925.
16. Unique features of Hodgkin's disease (lymphogranulomatosis). *Arch. Path. & Lab. Med.* 2:659, 1926.
17. Infestation with *Diphyllbothrium latum*, fish tapeworm. *J.A.M.A.* 92:1587, 1929.
18. Cardiac decompensation and its treatment. *Minnesota Med.* 12:487, 535, 1929.
19. Treatment of heart failure. *Journal-Lancet* 51:1, 1931.
20. Differential diagnosis of jaundice with special reference to congenital hemolytic jaundice. *Minnesota Med.* 15:479, 1932.
21. Importance of hepatomegaly and splenomegaly in differential diagnosis (with A. B. LITMAN). *Arch. Int. Med.* 50:240, 1932.
22. Pernicious anemia and tuberculosis: is there an antagonism? *J.A.M.A.* 100:1590, 1933.
23. Treatment of malnutrition in adults. *Minnesota Med.* 16:681, 1933.
24. Coronary disease. Quarterly, representing Minnesota educational, philanthropic, correctional and penal institutions 37:9, 1937.
25. Mechanism of dyspnea in heart failure. *Journal-Lancet* 58:257, 1938.
26. Art of medicine versus science of medicine. *Univ. Minnesota Med. School Digest*, January 1, 1938.
27. Chronic constrictive pericarditis with calcification. *Minnesota Med.* 22:138, 1939.
28. Syphilis of the liver with special reference to hepatic fever. *Urol. & Cutan. Rev.* 43:682, 1939.
29. Use and abuse of digitalis. *Minnesota Med.* 25:990, 1942.
30. Medical management of peptic ulcer. *Minnesota Med.* 26:205, 1943.
31. Cardiac emergencies and their treatment. *Journal-Lancet* 68:43, 1948.
32. Streptomycin and tuberculosis. *Minnesota Med.* 31:686, 1948.
33. Case record of St. Mary's Hospital, Duluth. *Minnesota Med.* 32:175, 1949.

Book Reviews

Aids to Neurology

E. A. BLAKE PRITCHARD, M.D., 1959. London: Bailliere, Tindall, and Cox; Baltimore: Williams & Wilkins Co. 480 pages. Illustrated. \$4.00.

The first edition of this book was published in 1932 and reprinted in 1939, 1941, and 1942. This second edition comes fourteen years later, during which time neurology has had tremendous advancement through research. In 2 appendixes appear outlines for "Clinical Examination of Nervous Activities" and "Interpretation of the Electro-Encephalogram." Dr. Pritchard is physician-in-charge of the department of neurology of the University College Hospital, London. His book is exceptionally complete, although published in an almost miniature scope. If this book were to be published in the usual size of medical textbooks, it would be a tremendous volume of considerable cost—at least \$12.00. Having been printed in small type on light paper, the 480 pages have been kept in modest size and are, therefore, available at a modest price. The completeness of the book is amazing, covering all of the conditions that affect nerves and the brain and everything from pathology through symptomatology, diagnosis, and treatment. The only difficulty for the American reader is the occasional recommendation of British remedies by their British names which are not used in the United States.

MORRIS FISHBEIN, M.D.
Chicago

Regulation of Cell Metabolism

G. E. W. WOLSTENHOLME and CECILIA M. O'CONNOR, Editors, 1959. Boston: Little, Brown & Co. 387 pages. Illustrated. \$9.50.

This monograph contains the 16 papers together with the discussions which were presented at a conference in London July 28 to 30, 1958. Of the 31 invited participants, 25 were from either Great Britain or the United States. In the words of the chairman, Sir Hans Krebs, this is "the first book surveying a variety of aspects of the non-hormonal regulation of cellular metabolism." A number of papers deal with the nature of intramitochondrial control of respiration and oxidative phosphorylation (Krebs, Slater, Chance, Lehninger, Martius) or with problems relative to the pentose phosphate pathway (Dickens) or with various aspects of control mechanisms of glycolysis and fermentation (Racker, Potter, Lynen, Holzer). Other papers are concerned with a newer concept of intracellular structure based on electron microscopy (Siekevitz); the significance of newly discovered cytoplasmic particles, termed "Lysosomes" (de Duve); some new observations on glycogen synthesis in muscle (Lipmann); and, finally, control mechanisms of growth and of enzyme synthesis in bacteria (Pardee, Dean, Magasanik). Each paper contains a list of references which are also summarized by an author index at the end of the book. A subject index provides a helpful guide to the reader.

G. A. FLEISHER, PH.D.
Rochester, Minnesota

Patient Care and Special Procedures in X-Ray Technology

CAROL HOCKING VENNES, R.N., and JOHN C. WATSON, R.T., 1959. St. Louis: C. V. Mosby Co. 203 pages \$5.75.

This book represents an extremely valuable aid to the x-ray technician, radiologist, and hospital nursing staff. For a long time, there has been a distinct need for a comprehensive monograph outlining the management of patients during their examination in the diagnostic roentgenologic department. This volume does not deal with roentgenographic technic as such but rather with the relationship of the patient to the technician and to the department during his examination. Very little of this kind of information may be obtained in standard volumes on roentgenographic technic. It is of primary importance, however, because a knowledge of the patient and his reaction to the examination and an understanding of the best methods of patient management and care are important elements of the diagnostic procedures.

The volume is written in an interesting and readable style, which nonprofessional employees will have little difficulty in understanding. The first chapters concern the general field of roentgenologic technology, including the relation of the department to the radiologic profession and to the hospital in general. Also in the first chapters there are discussions concerning the personal relationship between the technician and the patient. All these relationships are of primary importance and reflect the general level of professional medical care in an institution. The fourth chapter is concerned largely with the technical aspects of the department and gives the reason for certain types of examinations as well as an understanding of the various hazards inherent in these processes. In addition, an explanation of sterile technic and the administration of certain drugs is included.

The remainder of the volume is devoted principally to the technics and special examinations that are common to most hospitals. There is an excellent discussion of the general relation of the technician to the patient with respect to bedside and operative roentgenography and those situations in which patients present other special problems because of severe illness or the presence of unusual pieces of apparatus in the room. An adequate discussion of the various contrast examinations employed in the solution of gastrointestinal, biliary, bronchial, and renal problems is included in this chapter.

An excellent separate chapter on neuroroentgenography describes the uses of the various special procedures and the part to be played by the technician. While these procedures vary from institution to institution in certain respects, the basic technics are sufficiently alike to allow the technician an opportunity of becoming part of the radiologic team with little difficulty.

The various forms of vascular roentgenography are covered in quite a complete manner. Also covered, in a general way, are the uses of special technics, equipment

associated with cineradiography, rapid change of cassettes, and the use of roll-film magazines.

The last chapter is an exceedingly important one, dealing with various phases of roentgenography within the operating room. This discussion makes it possible for a perceptive technician to fit into the operating program with the least inconvenience to the operating team and, at the same time, be able to do technically satisfactory work as far as the roentgenography is concerned.

In conclusion, one might say that it is difficult to understand how hospitals and radiology departments have been able to get along these many years without this type of text, and it is predicted not only that this text will prove a valuable asset in the office of any radiologist but that it will become a standard textbook in the instruction courses dealing with any of the aspects of roentgenographic technology. It will also represent a valuable addition to the libraries of hospital or nursing institutions.

COLIN B. HOLMAN, M.D.
Rochester, Minnesota

Treatment of Diabetes Mellitus

E. P. JOSLIN, M.D., H. F. ROOT, M.D., P. WHITE, M.D., and A. MARBLE, M.D., 1959. Philadelphia: Lea & Febiger. 798 pages. \$16.50.

The appearance of the tenth edition of this book attests to its universal acceptance as the world's leading textbook on diabetes mellitus. The title may at one time have been appropriate but now carries the misleading implication that its subject matter is confined to the most controversial aspect of this disease, namely, its treatment. Indeed, only one of its 29 chapters is titled the "Treatment of Diabetes Mellitus." The remaining 28 chapters encompass nearly every facet of one of man's most complex maladies. It is doubtful that any medical center in the world contains the vast fund of clinical data on a single disease which is to be found in the Joslin Clinic together with the Baker Clinical Research Laboratory. The accumulated experience of nearly two generations is distilled into this single volume.

The advent of the sulfonylurea era, together with other antidiabetic substances, has outdated the ninth edition, although only 14 pages of the new edition are devoted to experience with these agents, which are currently prescribed for several hundred thousand diabetic patients. That the spurious utilization of oral hypoglycemic agents in obese and mild diabetics is widespread and unfortunate at present is a fact which could not be emphasized in this book because the realization of this fact postdated its publication.

The interesting chapter on "Hyperinsulinism and Chronic Hypoglycemia" deals admirably with a subject of increasing importance both in its recognition and treatment.

To limit this text to the shelves of the internist and specialist in diabetes is obviously erroneous, for it constitutes an unexcelled source of quick reference for the general practitioner. Its excellent index provides immediate access to nearly any problem relevant to this disease. The therapeutic challenge posed by a single case of severe acidosis, precoma, or coma will more than justify its purchase by the less experienced therapist in diabetes. Indeed, this is the standard reference text for the bulk of the world literature on diabetes mellitus. No physician, irrespective of how remote his interests may be, can totally avoid patients with this ubiquitous disease in his practice.

E. A. HAUNZ, M.D.
Grand Forks, North Dakota

Surgical Pathology

LAUREN V. ACKERMAN, M.D., 1959. St. Louis: C. V. Mosby Co. 1,096 pages. Illustrated. \$15.00

The second edition of this book has been extensively revised and moderately enlarged to cover some new subjects. An interesting feature of this new edition is the collaboration of the senior author and pathologist, Dr. Lauren Ackerman, with a surgeon, Dr. Harvey Butcher, to better correlate the common disease conditions met by the general surgeon and seen by the practicing pathologist. The book has been divided to discuss organs or regions of the body in separate chapters. In each chapter there is usually a general discussion of the organ or region followed by specific discussions of inflammatory, benign, malignant, and rare lesions in the order listed. New sections on wound healing and vessels have been added, along with 50 new illustrations.

In all sections the writing is clear, concise, and comprehensive for the material covered. The clinicopathologic correlations are excellent, and the text is profusely illustrated with photographs of both gross and microscopic pathology, which, for the most part, are of very high caliber.

No general textbook of surgical pathology can cover the infinite variety of unusual or atypical lesions that the pathologist will encounter. However, the authors have discussed the common lesions quite completely, giving the general theories of origin or associations with other conditions and stating which they feel to be correct on the basis of their own experience in such controversial subjects as the relation of cancer to benign peptic ulcers in the stomach. The book frequently explains to the surgeon what to expect the pathologist to be able to accomplish with frozen sections and when they should be used. The discussions of prognosis and the methods of handling the patient seem outstanding.

It is the feeling of the reviewer that this is the best book on surgical pathology so far written for the surgeons. The pathologist will find it of lesser value but will appreciate Dr. Ackerman's views on a number of subjects and the inclusion of certain conditions not discussed in other textbooks, such as the pseudolymphomatous hyperplasia in lymph nodes associated with some of the anticonvulsion drugs.

JOHN I. COE, M.D.
Minneapolis

Pancreatitis

HERMAN T. BLUMENTHAL, M.D., PH.D., and J. G. PROBSTEN, 1959. Springfield, Ill.: Charles C Thomas. \$9.50.

This is a good book for the practicing internist or surgeon to be familiar with. The authors, besides presenting a comprehensive review of the literature, have made a clinicopathologic correlation based on 163 observed autopsies. Five parts of the book include basic statistical considerations, the pathologic physiology of pancreatitis, the pathologic anatomy of the pancreas, the clinical manifestations of pancreatitis, and therapeutic measures in pancreatitis. The relationship of pancreatitis to hyperparathyroidism is brought out in the text.

It is the authors' stated purpose to discuss all the etiologic factors considered in the literature and place them in proper perspective. The idea has been presented that, under normal conditions, the destructive forces (in part enzymatic) and the protective mechanisms are in balance. Various etiologic categories presented act to upset this balance. The format of the book is very good.

C. A. MC KINLEY, M.D.
Minneapolis

Principles of Disability Evaluation

WILMER CAUTHORN SMITH, M.D., 1959. *Philadelphia: J. B. Lippincott Co.* 210 pages. \$7.00

The author of this book is the chief medical advisor for the Oregon State Industrial Commission and a Fellow of the American Association for the Surgery of Trauma. He has had many years of experience in the treatment and evaluation of industrial disability and has had long experience in the legal procedures involved. Since he is most familiar with the Workmen's Compensation Act of his home state of Oregon, most of the information is given in relation to this act. However, the acts of other states are comparable, and, while they may differ in detail, the general principles still hold true.

The book is divided into four sections, the first of which is introductory, defining many of the terms to be used later and giving the general principles upon which compensation is based. It discusses the responsibilities and duties of the examining doctor and some of the problems with which he may be confronted and gives in considerable detail the examiner-patient relationship and the type of report which he has found to be most effective. He stresses the importance of an accurate and complete report. He defines disability evaluation as "quantitative diagnosis" as opposed to the usual "qualitative diagnosis." The section on medical testimony is extremely good, giving the principles of good testimony and the pitfalls to be avoided as a medical witness.

Section II is entitled "The Nature of Disability" and discusses the concept of disability and the relationships between cause and effect, the necessity for permanence of disability before evaluation, the necessity of adequate time for healing and adequate treatment, and the medical relationships between the workman and his employment. The author explains the fact that a workman may have considerable disability and still be able to carry on his previous job by the concept of reserve physical capacity. Loss of this reserve physical capacity is just as real as loss of ability to work.

Section III expounds the relationship between injury and handicap. It is necessary for the physician who is evaluating disability to determine the causal relationship between the injury and the medical or pathologic condition found to be present and between the medical condition and the disability produced, since he is likely to be called upon to substantiate these relationships. These relationships often determine responsibility. The questions of responsibility for treatment and medical logic in questions of relationship are treated in considerable detail.

Section IV covers the subject of actual evaluation of disability and discusses the scheduled disabilities which are those stated specifically by law and the unscheduled disabilities which are not specifically stated in the law. Each area of the body is taken up individually, and the methods for determining the amount of disability and the percentage estimation of disability are illustrated. The book does not have a table of figures to which one can turn to obtain the percentage of disability but instead shows the principles upon which the estimation is based and the logical reasoning by which the disability is estimated.

In general, I would say that this is a very useful volume and one which every doctor should study if he is faced with the problem of estimating disability of any type. My main criticism of the book would be that it is sometimes verbose, the same statements being repeated in various sections. However, it is broken up into small subheads so that it is easy to look up the subject in which you are particularly interested. The advice

is well given that the doctor should confine himself to the impartial statement of medical facts and should not think in terms of dollars. I would recommend that every young doctor who is confronted with the prospect of testifying in court read the section on medical testimony and take its sage advice to heart.

MILAND E. KNAPP, M.D.
Minneapolis

Physiology of Cardiac Surgery

FRANK GOLLAN, M.D., 1959. *Springfield, Ill.: Charles C Thomas.* 96 pages. \$4.50.

This monograph, which was the Beaumont Lecture for the Wayne County Medical Society, presents in a very satisfactory manner a great deal of information about the physiologic aspects of open heart surgery.

The first chapter, on hypothermia, is historically excellent and discusses the many shortcomings of hypothermia alone in cardiac surgery. The author also discusses in this chapter the problem of capillary stagnation in hypothermia and suggests some possible techniques for future investigation to overcome these difficulties.

Chapter 2 is devoted to extracorporeal circulation, and, in this chapter, the author traces the rapid developments of recent years which have led to outstanding results in open heart surgery. However, he points out the limitations of some of the present day extracorporeal systems and in the third and final chapter, entitled "Extracorporeal Cooling," mentions the many advantages of combining hypothermia with a pump oxygenator system. He feels that this combination of techniques eliminates or definitely minimizes many of the shortcomings of the extracorporeal system alone. He presents numerous physiologic studies (many of his own) to further substantiate the advantages of combining these two techniques.

The bibliography is excellent and, historically, quite accurate. The book serves a real purpose in bringing the physician and cardiac surgeon as up to date as possible in this ever changing field.

VINCENT GOTT, M.D.
Minneapolis

De Circulatione Sanguinis

WILLIAM HARVEY; translated from the original Latin by KENNETH J. FRANKLIN. *Springfield, Ill.: Charles C Thomas.* 184 pages. \$4.50.

This book is an excellent translation from the Latin of 2 anatomical essays and 9 letters by the great William Harvey.

Following Harvey's discovery of the circulation, there were, of course, arguments pro and con regarding its scientific correctness. Even those who had never dissected a body or even seen a post-mortem examination felt that they had the necessary authority to disagree with Harvey. Who, after all, was Harvey but a new man on the scene with a new idea that contradicted all the accepted theories of the past? To many he was a bold imposter trying to destroy the firm foundations of the past.

On the other hand, there were many who accepted his work, and there were also able scientific men who failed to see eye to eye with him on his explanation of the circulation of blood. These latter men were the ones mainly concerned in his letters. His answers to their arguments constitute some of the most beautiful and brilliant writing in the English language.

For anyone interested in medical history and in reading letter writing at its best this book will be of immense interest.

ARNOLD S. ANDERSON, M.D.
St. Petersburg, Florida

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News Briefs . . .

North Dakota

DR. JAMES L. MAHONEY of Devils Lake has been elected president of the North Dakota Society of Obstetrics and Gynecology. Dr. John Gillam was elected vice president, Dr. G. Wilson Hunter, secretary-treasurer. Both are from Fargo.

• • • •

DR. ELLIS OSTER of the Ellendale Clinic presented a paper on "Trauma to the Uterus in Pregnancy" at the annual meeting of the North Dakota Society of Obstetrics and Gynecology in Grand Forks. The paper was prepared jointly by Dr. Oster and Dr. Eugene F. Bolliger, also of the Ellendale Clinic.

• • • •

DR. H. C. KRAHN has taken up offices in the new Walhalla Medical Center, sponsored by the Walhalla Development Corporation.

• • • •

DR. BURTON G. OLSON of Minot was among 1,015 surgeons who were inducted as new fellows of the American College of Surgeons at the annual clinical congress in Atlantic City, New Jersey, October 2.

• • • •

DR. ARTHUR EWERT has opened his practice in a new clinic in Goodrich. A native of Poland, he received his medical education in that country, coming to the United States in 1956. He interned in Bismarck, studied at the University of Pennsylvania, and passed his North Dakota license examinations in July.

• • • •

DR. ANTHONY ZUKOWSKY of Steele has moved into new offices in the Ness Building. He formerly was located in the Steele Ozone Building.

• • • •

DR. D. H. LAWRENCE, general practitioner at Fargo and Cass County coroner, has moved his offices from 69½ Broadway to 306 Black Building.

• • • •

DR. LEONARD LARSON of Bismarck, who is chairman of the American Medical Association's board of trustees, has been appointed chairman of the planning committee on health and medical care for the 1961 White House Conference on Aging.

• • • •

DR. W. G. GARRETT, pediatrician at the Missouri Valley Clinic in Bismarck, has been voted in as a full partner. A native of Council Bluffs, Iowa, Garrett is a graduate of the University of Iowa, interned at Mercy Hospital, Des Moines, and completed his residency at Children's Hospital, Denver. He joined the staff of the Missouri Valley Clinic in 1958.

DR. JON V. EYLANDS has taken over the Rolla practice of Dr. R. M. Gilchrist, the latter having moved to California. Eylands is the son of the Rev. Dr. V. J. Eylands, pastor of the First Icelandic Lutheran Church in Winnipeg, Canada. A graduate of the University of North Dakota and McGill University, Eylands had hospital training in Grand Forks, Fargo, and Montreal.

• • • •

DR. RODNEY G. CLARK, a partner in the Grand Forks Clinic, has been certified as a Diplomate of the American Board of Obstetrics and Gynecology. He is a Fellow of the American College of Obstetricians and Gynecologists.

Minnesota

DR. GRACE ROTH, emeritus member of the Mayo Clinic staff, has become associated with the Lovelace Clinic in Albuquerque, New Mexico. A member of the Mayo Clinic staff from 1937 to her retirement last July, she has worked on functional aspects of the heart and blood vessels and clinical investigative physiology.

• • • •

DR. GERSHOM J. THOMPSON of the Mayo Clinic staff in Rochester has been reelected a vice president of the United States section, International College of Surgeons.

• • • •

DR. FREDERIC J. KOTTKE, head of physical medicine at the University of Minnesota, has been elected president of the American Congress of Physical Medicine and Rehabilitation. Dr. Donald J. Erickson, Rochester, was elected a vice president, and Dr. Frank H. Krusen, also of Rochester, was reelected treasurer.

• • • •

DR. JACK GARDNER, Ceylon physician for the past four years, has been appointed Martin County coroner. He will move to Fairmont, where he also will become associated in practice with his father, Dr. V. H. Gardner. He will fill out the unexpired term of Dr. M. H. Marken, who resigned as coroner.

• • • •

DR. RICHARD STENNETT, St. Thomas, Ontario, has been appointed clinical psychologist with the community mental health clinic serving Itasca, Koochiching, and Aitkin counties. Offices of the clinic will be set up in the Itasca court house. Stennett has been chief psychologist at Ontario Hospital in St. Thomas, a 2,200-bed hospital. He is a graduate of the University of Western Ontario and McGill University.

(Continued on page 26A)

highlights of a nationwide survey

A REPORT
ON THE TREATMENT IN PRIVATE PRACTICE
OF 2,274 PATIENTS
WITH ALLERGIC DISORDERS

RESULTS OF ANERGEX THERAPY BY
202 PHYSICIANS IN PRIVATE PRACTICE

disease classification	no. of patients treated	excellent	good	fair	unimproved
allergic rhinitis:					
perennial	492	196	176	67	53
spring	209	80	85	31	13
fall	248	87	114	35	12
spring & fall	198	73	77	19	29
		77%			
extrinsic asthma	492	175	178	68	71
		72%			
eczema	260	119	71	42	28
		73%			
food allergy	173	85	42	13	33
		73%			
contact dermatitis	157	54	62	23	18
		73%			
other	45	17	15	1	12
		71%			
total patients treated	2274	886	820	299	269
		75%			

These results were obtained following a single short course of injections

Compiled from questionnaires sent to practicing physicians in communities of various sizes throughout the country, who were asked to indicate the number of patients they had treated, and to classify the results as Excellent, Good, Fair, or Unimproved.

THE NEW CONCEPT FOR THE TREATMENT OF ALLERGIC DISEASES

ANERGEX minimizes or abolishes allergic reactions with a single short course of injections of 1 ml. daily for 6-8 days.

ANERGEX is non-specific; it provides relief regardless of the offending allergen or the symptoms present.

ANERGEX provides prolonged protection. The non-reactive state, or anergy, is usually maintained for months after the initial course of treatment; this can be prolonged by occasional booster doses, if necessary.

ANERGEX*

the new injectable for inhibiting the allergic response

what it is: A specially prepared botanical extract obtained from the *Toxicodendron quercifolium* plant which has a non-specific action and inhibits a wide variety of allergic responses. It is not an antihistamine affording merely temporary relief, nor is it a substance which neutralizes or blocks the action of a single allergen only.

administration: Adult dose, 1 ml. intramuscularly daily for 6-8 days. Anergex appears to be more effective when given during exposure to reasonable amounts of the offending allergen.

advantages: Anergex eliminates skin testing, long drawn-out desensitization procedures, and special diets. No systemic reactions have been reported.

what it's for: *Seasonal allergic rhinitis*—hay fever, rose fever, pollinosis.

Non-seasonal allergic rhinitis—dust, dander, molds and other inhalants.

Extrinsic asthma—foods, inhalants, dust, dander, pollen.

Asthmatic bronchitis—so common in children.

Eczema—especially in infants and children.

Food sensitivity—manifested by indigestion, nausea, vomiting, diarrhea, eczema, asthma, or rhinitis.

available: Multiple-dose vials containing 8 ml.—one average treatment course.

REPRINTS AND LITERATURE AVAILABLE

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*Trademark Reg. U. S. Pat. Office

Patent Applied For

NEWS BRIEFS

(Continued from page 22A)

DR. W. E. MATHEWS, general practitioner, has become associated with Dr. R. B. Engstrom in Mankato. A native of Duluth, Mathews is a 1958 graduate of the University of Minnesota and interned at St. Joseph's Hospital in St. Paul.

• • • •

DR. T. T. HARADA has left Lake Wilson after eight years of practice to become staff surgeon at Shasta County Hospital in Redding, California. Before going to Lake Wilson, Harada was a surgeon in the Veterans Administration Hospital in Minneapolis.

• • • •

DR. MAGNUS C. PETERSEN has announced he will retire March 1 as superintendent of Rochester State Hospital to protest the state's mental hospital situation. Petersen, 66, will enter the private practice of psychiatry after seventeen years at the hospital. He objected to lack of appropriations for the hospital and legislative and departmental restrictions on expenditure of funds.

• • • •

DR. KALMAN GOVRIK and Dr. James Fisch have been appointed to the medical staff of Hastings State Hospital. Govrik is a native of Hungary, where he received his medical training. He has taken further training in this country and has served as house physician at St. Joseph's Hospital in St. Paul and as St. Paul police surgeon. At Hastings he will work with geriatric patients. Fisch has a temporary appointment and will return to Michael Reese Hospital in Chicago to continue his studies in psychiatry.

• • • •

CONSTRUCTION of a building designed as doctors' office quarters was begun in July in Mahanomen. The building will have separate entrances and quarters for a medical doctor, a dentist, and an optometrist. Lease arrangements are being made with Dr. W. R. Koons, Dr. N. T. Diekman, and Dr. J. D. Johnson.

• • • •

DR. FLETCHER A. MILLER, associate professor of surgery at the University of Minnesota, has joined the research team at Mt. Sinai Hospital, Minneapolis, as director of surgical research and teaching. He will continue teaching part time at the university. He is a graduate of the universities of Iowa and Minnesota and Columbia University.

• • • •

DR. CHARLES PELZL, Pine River, has been appointed Cass County coroner to succeed Dr. H. M. Brown of Walker, who recently resigned.

• • • •

DR. JOHN S. LUNDY has retired from the board of commissioners of Olmsted County's Mineral Springs Sanatorium. He is being replaced by another Mayo Clinic physician, Dr. Herbert W. Schmidt. Lundy is a senior consultant in anesthesiology in the Mayo Clinic and professor of anesthesiology in the Mayo Foundation. Schmidt is head of a section of medicine in the clinic and is vice president of the clinic staff.

DR. RUSSELL MORSE WILDER, emeritus consultant in medicine of the Mayo Clinic and emeritus professor of medicine in the Mayo Foundation, has been named an honorary member of the American Dietetic Association. A specialist in metabolism and nutrition, Dr. Wilder has been especially interested in research into human dietary requirements.

• • • •

A ROOM in memory of the late Dr. Howard K. Gray, Mayo Clinic surgeon, was dedicated in the headquarters of the Royal College of Surgeons of England in Lincoln's Inn Fields, London. Mrs. Gray and son, Howard K., Jr., were to participate in the ceremonies September 24.

• • • •

DRS. VICTOR AND SIGRID GILBERTSEN of Spring Lake Park have added civic responsibilities to their medical work. He is a member of the Spring Lake Park Village Council, and she is president of the Spring Lake Park School Board.

• • • •

DR. AND MRS. B. M. STEVENSON were honored by their fellow citizens for thirty-three years of service to Fulda on the eve of their departure for Oregon. A native of Rockwell City, Iowa, Stevenson graduated from the University of Iowa and taught anatomy at Iowa City before coming to Fulda.

• • • •

CHASKA'S NEW medical building opened for business at the end of August. It is owned by, and has offices for, C. R. Heinzerling, M.D., and Edgar F. Ziegler, D.D.S.

• • • •

DR. HARRY J. BAKER of Hayfield was honored in late August by more than 1,000 residents of the community for a half-century of service. In 1957, the Minnesota State Medical Association presented him with a membership certificate in the "Fifty Club." A graduate of the Minneapolis College of Physicians and Surgeons, he practiced in Virginia, Eveleth, and Waltham before moving to Hayfield.

• • • •

DR. GILMAN GOEHRS was reelected for his third term as president of the St. Cloud Board of Health.

• • • •

DR. CHARLES W. MAYO of Rochester was made an honorary member of the American Hospital Association at its annual meeting in New York.

• • • •

DR. STARKE R. HATHAWAY, University of Minnesota professor of psychiatry and director of the division of clinical psychology at the university's medical school, was honored at the American Psychological Association's annual meeting in Cincinnati. He received the Distinguished Scientific Contribution Award in the association's division of clinical psychology.

• • • •

DR. CHARLES VANDERSLUIS has joined Dr. C. H. Holmstrom and Dr. E. E. Pumala in the Warren Clinic. Formerly of Bemidji, Dr. Vandersluis is trained in general practice.

(Continued on page 28A)

“R Day”

*for the neuritis patient
can be tomorrow*

“R Day”—when pain is relieved—can come early for patients with inflammatory (non-traumatic) neuritis if treatment with Protamide is started promptly after onset.

Protamide is the therapy of choice for either early or delayed treatment, but early use assures greatest efficacy.

For example, in a 4-year study¹ and a 26-month study² a combined total of 374 neuritis patients treated with Protamide during the first week of symptoms responded as follows:

60% required only 1 or 2 daily injections for complete relief

96% experienced excellent or good results with 5 or less injections

Thus, the neuritis patient's first visit—especially an early one—affords the opportunity to speed his personal “R Day.”

Protamide is available at pharmacies and supply houses in boxes of ten 1.3 cc. ampuls. Intramuscularly only, one ampul daily.

PROTAMIDE®



PAGE 794

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Detroit 11, Michigan



1. Lehrer, H. W., et al.: Northwest Med. 75:1249, 1955.

2. Smith, Richard T.: New York Med. 8:16, 1952.

Deaths . . .

DR. ELMER W. ARNOLD, 76, a physician in Adrian, Minnesota, for forty-two years, died September 2 in the community hospital named in his honor. At the time of Dr. Arnold's death, the hospital work was nearing completion. A native of Marcus, Iowa, Dr. Arnold was educated at a Congregational academy in Redfield, South Dakota, and at the University of Nebraska.

* * * *

DR. M. L. RANSOM, 86, pioneer physician and surgeon and a resident of Hancock, Minnesota, for fifty-six years, died August 27 in Morris, Minnesota. Dr. Ransom took a leading part in the early civic and social life of Hancock, serving as councilman, health officer, and first commander of the Hancock American Legion post. A native of Ulster, Pennsylvania, he graduated from Jefferson Medical College. During World War I, he served in the Army Medical Corps. He was a former president of the West Central Minnesota Medical Society.

* * * *

DR. O. W. SCHOLPP, 80, who had practiced for fifty years in Hutchinson, Minnesota, died on August 26 in Hutchinson. A native of Bulmann, Alabama, he graduated from Colgate University and the University of Maryland, coming to Hutchinson in 1909. He also attended the University of Minnesota and University of Vienna and studied at Johns Hopkins, Massachusetts General, and Bellevue hospitals, specializing in radiology.

ISABEL A. FARR, 73, registrar of the Mayo Foundation for Medical Education and Research from 1915 to 1951, died September 3 in Rochester, Minnesota. A native of Nashua, Iowa, Miss Farr was the foundation's first registrar and in that capacity helped in shaping its educational programs. She was a member of the staff of both the Mayo Clinic and Mayo Foundation. Miss Farr had been curator of the historical committee of the Mayo Clinic since 1953.

* * * *

DR. EVELYN BROWE, 50, died on August 24 in St. Joseph's Hospital in Brainerd, Minnesota. A native of Minneapolis, Dr. Browe was anesthesiologist at the municipal hospital in Staples, Minnesota, from 1956 to 1958. In 1958, she took a similar post in Brainerd.

* * * *

DR. EDGAR T. HERRMANN, 66, of St. Paul, died August 26 in Miller Hospital, St. Paul, after an illness of four years. A native of St. Paul, Dr. Herrmann specialized in internal medicine. He had practiced in St. Paul for more than thirty-five years.

* * * *

DR. T. N. FLEMING, 79, died August 24 at St. Cloud, Minnesota. He was born in Sutton, Nebraska, and was graduated from the University of Nebraska and Creighton Medical School. At one time he served as superintendent of school in Lyon, Nebraska, and was principal of Omaha high schools. He practiced medicine in Creighton and Cold Spring, Nebraska, and moved to St. Cloud after specializing in eye, ear, nose, and throat. He retired from practice in November 1958.



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METRAZOL

reactivates the convalescent



METRAZOL

reactivates the fatigued

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Each tablet, 100 mg. METRAZOL. Each teaspoonful, 100 mg. METRAZOL and 1 mg. thiamine.

— for those patients who need additional vitamins —

Vita-METRAZOL Elixir and Tablets

Each teaspoonful, 100 mg. METRAZOL, 10 mg. niacinamide, 1 mg. each of thiamine, riboflavin, pyridoxine, and 2 mg. d-panthanol. Each tablet, in addition, 25 mg. vitamin C.

METRAZOL® brand of pentylenetetrazol, E. Bilhuber, Inc.

packaging

Tablets in 100's and 500's. Liquid (wine-like flavored 15 per cent alcoholic solution) in pints.

KNOLL PHARMACEUTICAL COMPANY

(formerly Bilhuber-Knoll Corp.)

Orange, New Jersey

COMING in *January* . . .

*Articles and features to be found in the next issue of
THE JOURNAL-LANCET, and notices of future meetings*

• This "Coming In" page takes on special significance for January 1960, since that month heralds the start of the ninety-first year of publication of THE JOURNAL-LANCET. Naturally, the editors take a great deal of pride in having been a partner in bringing to physicians in the North Central part of the nation nine decades of important news of medical advances. As we enter into this new decade, it will be our purpose to strive always to continue to bring to our readers the latest and the most important information to assist them in their practice of medicine.

• One of the earliest issues of THE JOURNAL-LANCET, back in the early 1880's, spoke of the growing number of medical journals and the scarcity of the doctor's time in which to keep abreast of new procedures, drugs, and methods. Certainly, the problem has not greatly changed over these many years; rather, it has been compounded several times over. Awareness of this continuing situation will keep the editors constantly tuned to the responsibility of bringing to the readers of THE JOURNAL-LANCET the best in medical literature in the most concise fashion and in a form which is most applicable to their practice.

• In January, JOURNAL-LANCET continues the special series on Cardiovascular Diseases. Dr. Francis B. Tiffany, clinical instructor of medicine, University of Minnesota, in a paper on the "Diagnosis and Treatment of Cardiac Emergencies" writes that rational and successful treatment of cardiac emergencies requires the maximal use of the facilities always present: one's eyes, ears, and hands; that the recognition of these emergencies be carefully thought out beforehand; and that the physician be constantly critical of his own diagnoses in the light of changes in the clinical picture and response to therapy.

• The companion paper in the series is by Dr. David M. Craig of St. Paul on "The Management of Congestive Heart Failure."

• The quarterly "Section on Pain," edited by Dr. John S. Lundy, recently retired from the Mayo Clinic and now of Chicago, will present two papers in this series. One is written by Henry M. Feinblatt, M.D., F.A.C.P., on the "Treatment of Gastritis, Ulcerlike Pain, and Ulcer Syndrome," and presents a clinical and roentgenographic evaluation of a new medication. The second paper is by Dr. Walter C. Alvarez on the "Desensitizing Factors in Cases of Migraine."

Meetings and Announcements

A.M.A. CLINICAL MEETING

The American Medical Association will hold its 13th clinical meeting Dec. 1 to 4 in Dallas, Texas. The meeting is designed mainly for the family physician. Subjects to be discussed include soft tissue injury, whiplash injuries of the neck, diabetes, heart murmurs in children, new laboratory procedures, new resuscitation techniques, premarital and marital counseling and the problem child.

Dr. Hubertus Strughold, professor of space medicine at the School of Aviation Medicine, Randolph Air Force Base, Texas, will speak on medicine in the space age. Dr. Michael E. DeBakey, winner of the A.M.A.'s distinguished service award, will take part in a symposium on the surgical considerations of cerebrovascular insufficiency.

The meeting will be preceded on Nov. 30 by a national conference on the medical aspects of sports.

COURSE FOR ALLERGISTS

The American College of Allergists will hold its graduate instructional course and annual congress Feb. 28 to March 4, 1960, at the Americana Hotel, Bal Harbour, Miami Beach. For further information write to John D. Gillaspie, M.D., Treasurer, 2049 Broadway, Boulder, Colorado.

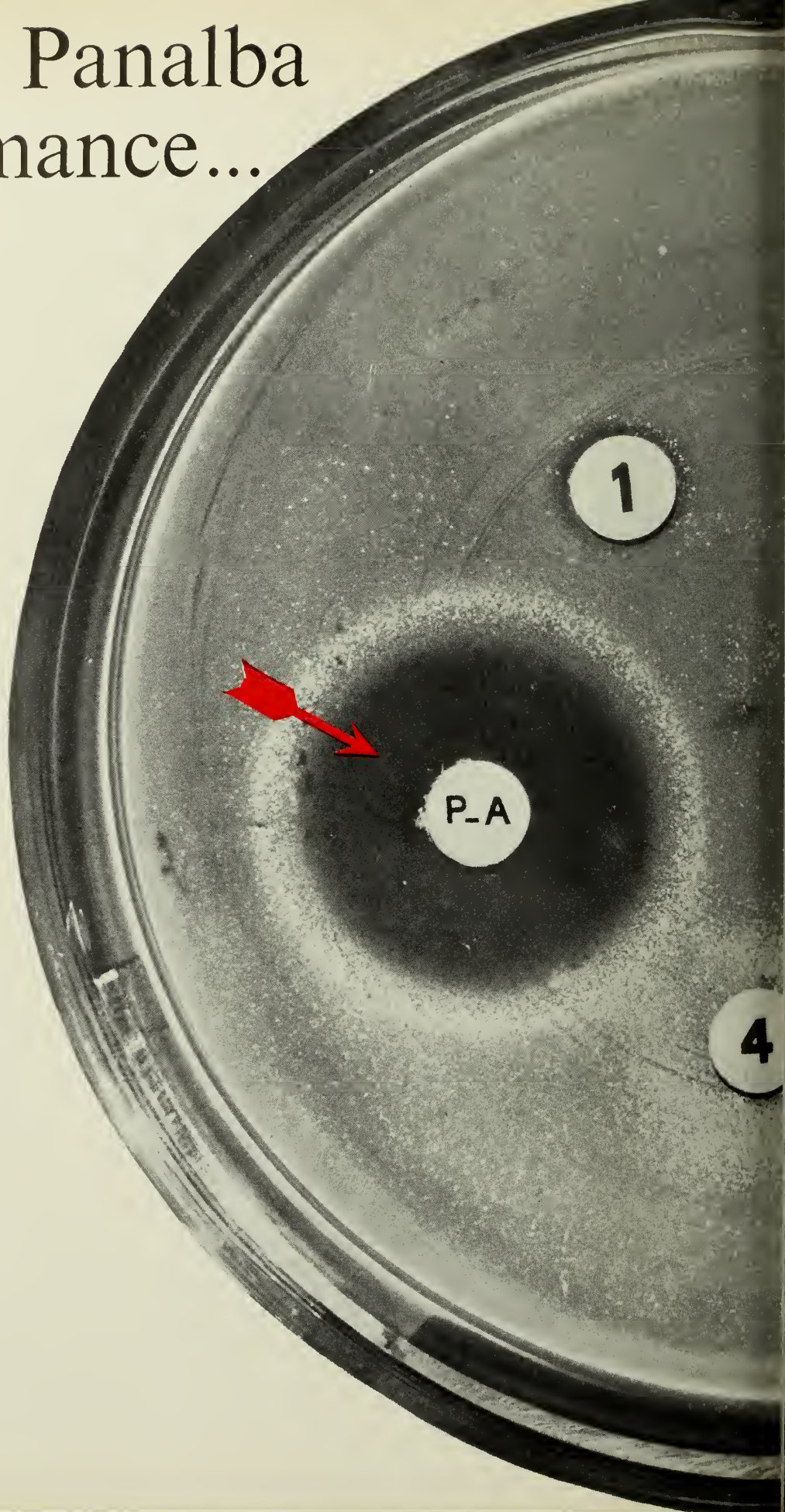
CHANGING MEDICAL CONCEPTS

Deborah Hospital, Browns Mills-in-the-Pines, New Jersey, announces the second international symposium on Changing Concepts in Medicine (Congenital Heart Disease) will be held April 28 to 30, 1960, at the Bellevue-Stratford Hotel, Philadelphia. Address inquiries to Dr. Charles P. Bailey, The Deborah Hospital, Browns Mills, New Jersey, or Dr. Charles P. Bailey, Deborah National Office, 907 Walnut St., Philadelphia 7.

CANCER CONFERENCE

The Fourth National Cancer Conference sponsored by the American Cancer Society, Inc., and the National Cancer Institute will be held Sept. 13 to 15, 1960, in Minneapolis. The theme will be "Changing Concepts Concerning Cancer." For information write to Medical Affairs Department, American Cancer Society, 521 W. 57th St., New York City.

This is Panalba
performance...



Osteitis Deformans

ROBERT HILKER, M.D.

Minneapolis, Minnesota

IN 1876, Sir James Paget, in reporting 5 cases, presented the classic description of the disease which bears his name.¹ However, he was not the first to note the condition. Urany, in 1867, and Wilks, in 1869, described cases.² Paget, believing the malady was due to a chronic inflammation of the bone, termed it osteitis deformans. Unbeknown to him was the fact Czerny also had named the disease osteitis deformans in 1873.² As soon as the disease became known, people sought to prove it was not a new condition. Characteristic bone lesions have been found in Indian skeletons excavated in the upper mid-western United States. Hutchinson² found evidence in an ancient Egyptian skull. Butlin,² not to be outdone, described the Neanderthal man's skull as having the lesions of osteitis deformans. Through the past century, a vast descriptive and speculative literature has been compiled in many tongues, but really very little has been added or deleted from Paget's original description.

ETIOLOGY

The etiology of the disease is unknown. Many hypotheses have been forwarded concerning the cause. Paget¹ believed that the disease was due to a chronic inflammatory process. Morpure and associates³ claimed that they found a diplococcus in the bone of patients with osteitis deformans and osteomalacia. Later investigators have found the involved bone to be sterile. Knaggs³ thought that a toxin might be responsible for the condition. Lancereaux³ suggested that nerve lesions may be important in the production of osteitis

deformans. Many French investigators³ believed that syphilis was the origin of the disease. The Wassermann test, however, has been found to be positive in only 3 to 8 per cent of cases.⁴ Bécélère⁵ believed that there was a connection between arteriosclerosis and Paget's disease. Trauma and avitaminosis have also been implicated as causes.⁵

During the present time, the argument still rages as to whether the condition is a generalized or metabolic disease or a localized or focal disorder of the bone. Cases associated with both hypothyroidism and hyperthyroidism have been described. Schmorl⁶ found a parathyroid tumor in 1 case as did other investigators⁷ in isolated instances. Because of extensive osteitis fibrosa in both conditions, many thought Recklinghausen's and Paget's diseases were the same entity. Albright and Reifenstein⁸ contended that osteitis deformans was not due to hyperparathyroidism. The differences between the two conditions are summarized in the table.⁹

Others have thought that the pituitary gland was implicated in this disease. Boom⁵ found a pituitary cyst causing Simmond's disease in a patient with Paget's disease. Since the disease occurs most frequently in the older age group, it is possible that, with the decreased end organ activity in old age, there is increased pituitary output. Growth hormone has been incriminated. Moehlig and Abbott¹⁰ demonstrated a high incidence of impaired carbohydrate metabolism as evidenced by abnormal glucose tolerance tests as well as increased incidence of familial diabetes. Apperly and Cary⁴ felt that the abnormal dextrose-tolerance curves found in their patients with Paget's disease were compatible with hyper-

TABLE
DIFFERENCES BETWEEN RECKLINGHAUSEN'S DISEASE
AND PAGET'S DISEASE

	<i>Recklinghausen's disease</i>	<i>Paget's disease</i>
<i>Etiology</i>	Parathyroid adenoma	Unknown
<i>Extension</i>	Generalized throughout skeleton	Limited to some bones only
<i>Histology</i>	Hyperactivity of osteoclasts	Mosaic structures
<i>Giant cell tumors</i>	Often present	Never present
<i>Röntgenologic features</i>	Generalized decalcification of cortex, with dilation of haversian canals	Thickening of cortex with a new, mainly fibrillar architecture; often, perosteal bone formation
<i>Age of incidence</i>	From youth onward	Usually after age of 40
<i>Biochemical features</i>	Increased calcium and phosphatase; decreased inorganic phosphorus in the serum; increased calcium and phosphorus in the urine	Normal calcium and phosphorus; increased phosphatase in serum; normal calcium and phosphorus in the urine

pituitarism and also suggested that skull changes may affect the pituitary fossa. Objections to the metabolic theory are many. In acromegaly and gigantism associated with overproduction of growth hormone, one doesn't find the characteristic bone lesions of Paget's disease.¹¹ Schneeberg¹² showed that increasing age serves to depress tolerance to both oral and intravenous glucose. Oral and intravenous glucose tolerance tests performed on patients with Paget's disease did not differ significantly from similar tests performed on normal control subjects of a similar age group. Though Moehlig and Abbott¹⁰ had found that 88 per cent of their patients with Paget's disease had diabetic glucose tolerance tests, Schneeberg believed that the difference between their findings was one of interpretation only. He concluded that the malady was not a metabolic disease. Joslin¹³ has stated that 1 person in 4 has diabetic relatives, which was near the incidence that Moehlig and Abbott¹⁰ quoted.

Gutman and Kasabach⁷ hold that the disease is due to a local disturbance in bone metabolism. The most recent authors are in accord with this belief. Albright and Reifenstein⁸ say "if anyone defines a 'localized bone disease' as one that is not generalized, Paget's disease is localized." This disease has a spotty distribution like an infection, tumor, trophic nerve disturbance, or a vascular lesion. They conclude and echo the thoughts of Edholm and associates¹⁴ that there is much to suggest that the disorder is vascular. More will be said of this later.

HEREDITY

McKusick¹⁵ believes that the hereditary nature of this process has been established. Family history

of osteitis deformans in affected patients has ranged from 3.5 to 50.8 per cent.¹⁶ In a few families, a very high incidence of the disease was present. It has been reported in identical twins.¹⁵ Because the disease is usually seen in old age, when memories are poor and families are widely scattered, and because many never live long enough for the disease to become evident, it is hard to obtain a good pedigree from which the disease can be traced. Also, since the disease is so frequently asymptomatic, the hereditary background is still further clouded. McKusick¹⁵ states that the condition is transmitted by an autosomal mendelian dominant mechanism. Moehlig and Abbott¹⁰ have pointed out that, in addition to diabetes, there is a high incidence of height and obesity in both Paget's disease and osteoporosis.

INCIDENCE

There is a wide discrepancy in reported incidence of the malady. Sugarbaker¹⁷ noted that it occurred in 1 in 4,500 hospital admissions. Newman¹⁸ reported an incidence of 0.064 per cent, and Rosenkrantz and associates⁴ reported that 1 in 850 admissions had the disease. Schmorl¹⁶ reported an incidence of 3 per cent in 4,614 necropsies on unselected persons more than 40 years of age. Collins¹⁷ reported a figure of 3.7 per cent on 650 unselected necropsies in a group of similar age. It is evident that, if the autopsy frequency is correct, the majority of cases must be missed clinically.

All observers agree that osteitis deformans is rarely discovered in persons under the age of 40 years. But, nearly every investigator had 1 case in his series in a patient who was much younger than the rest of the group. Proved cases have occurred in teenagers.¹⁹ The disease is first diagnosed in the majority of patients at the average age of 55 to 60 years. Dickson and associates³ reported that the diagnosis was first made at the average age of 56, while the average age of onset of symptoms was 53. Collins¹⁷ showed that the incidence at necropsy rose progressively from 3.6 per cent in the 55 to 70 age group to 9.1 per cent in the 85 to 95 age group.

Race does not seem to be a factor. Rosenkrantz and associates⁴ found that the incidence in white persons and Negroes was about the same. No persons of a particular nationality, occupation, or socioeconomic group seemed to be more affected than others.⁷

Most surveys report a slight preponderance of the disease in men. Dickson³ found 246 men and 121 women with the disease, while Gutman and Kasabach⁷ found an equal number of each sex affected in their series. However, Collins¹⁷ found

a slightly higher incidence in women (4 per cent).

CLINICAL COURSE

Mode of onset is variable. Osteitis deformans may be present for many years without the patient being aware of any unusual symptoms. A large number of cases are discovered incidentally in the course of roentgenologic examination for other diseases. Between 20 and 50 per cent are asymptomatic at the time of discovery of this disease.^{3,4}

Paget¹ described the disease as follows: "The disease begins in middle age or later, is very slow in progress, may continue for many years without influence on general health, and may give no trouble other than changes of shape, size, and direction of the diseased bones. Even when the skull is hugely thickened and all its bones exceedingly altered in structure, the mind remains unaffected. This disease affects most frequently the long bone in the lower extremities and the skull and is usually symmetrical. The bones enlarge and soften, and those bearing weight yield and become unnaturally curved and misshapen. The spine, whether by yielding to the weight of the overgrown skull or by change in its own structure, may sink and seem to shorten with greatly increased dorsal and lumbar curves; the pelvis may become wide; the necks of the femora may become nearly horizontal; but the limbs, however misshapen, remain strong and fit to support the trunk."

If the disease is symptomatic, bone pain is the predominant complaint. Pain occurs predominantly in the back, hips, and lower extremities. It is described most frequently as "rheumatic-like" or a dull, nonlocalizing ache.^{3,7} There are varying degrees of joint stiffness. Head pain is a severe complaint in some; others note defective hearing. Still others claim that their head is growing progressively larger, for example, they buy a larger hat every year. Some other major complaints are deformity of involved bones, reduction of stature, or fatigue. A few first present themselves with pathologic fractures or malignancy.

PHYSICAL DIAGNOSIS

In the polyostotic advanced case, the diagnosis can be made by inspection.²⁰ The whole calvarium may be enlarged or there may be frontal bosselation. The temporal arteries are often prominent and tortuous. The head seems to be tipped forward. In some, the size of the facial bones may be markedly increased, giving the face a lion-like expression (*leontiasis ossea*). The

clavicles are prominent and distorted and dorsal kyphosis is pronounced. There may be unilateral or bilateral bowing of the femora, usually with the convexity toward the lateral aspect. The tibiae may be markedly enlarged with antero-lateral convexity distortion. The skin over involved bones is often much warmer to the touch than over unaffected areas. Varices and marked muscle atrophy may be seen if the lower extremities are extensively involved. The patients may walk with an uncertain broad-based waddle, described by some as a Charlie Chaplin gait. Deafness and signs of congestive heart failure may be noted. The pulse rate is often rapid. Funduscopic examination may reveal angioid streaks around the optic disk. This finding has been associated with pseudoxanthoma elasticum. Shaffer and associates²¹ believe that these two conditions may be interrelated but have found only 1 case in which both diseases were present. In more localized bone involvement, 1 or many of the above findings may be present.

BONE INVOLVEMENT

Paget's original belief that the most frequent site of osteitis deformans was the skull and tibia has been disproved. He was misled because he didn't have roentgenology to help him and had to rely on physical findings alone. Obviously, changes in the skull and long bones are more easily diagnosed by inspection than by the minor changes often found in the spine and sacrum. Both roentgenologic survey and necropsy studies have shown that the highest incidence of involvement is in the pelvic bones. Schmorl¹⁶ found that the sacrum was the bone most frequently involved, being affected in 56 per cent of cases. This bone is followed in frequency by the spine, skull, femur, and tibia in that order. No bone is exempt from the disease; however, the ribs and bones of the feet and hands are rarely involved. The lumbar vertebrae and sacrum were involved in 3 out of 4 cases in Collins' series.¹⁷ The incidence of the disease in the vertebral bodies rapidly diminished in the cervical vertebrae. Collins found a solitary focus in a single bone in only about 10 per cent of cases. It thus seems that the axial skeleton is the hardest hit by the disease. It is incidental to note that the bones most frequently involved in Paget's disease are also the seat of 68 per cent of the osseous metastases seen in mammary carcinoma.¹⁷ The exception is the high percentage of carcinoma lesions seen in the ribs.

ROENTGENOLOGIC MANIFESTATIONS

Today, the diagnosis of osteitis deformans is al-

most exclusively made by roentgenograms. However, in Collins' necropsy series, only 29 per cent of cases were diagnosed autemortem. Many cases are accidentally found because of the high incidence in the pelvis and lumbar spine and because radiographic studies are so frequently done in this area of the body as to rule out other pathology. The roentgenologic picture varies in different bones.

Skull. Schuller⁵ first described two skulls in which there was a large and sharply limited area of decreased density in the anterior part of the cranium. This was termed "osteoporosis circumscripta." It has been definitely established that this is a primary phase of osteitis deformans. The frontal neurocranium is the most frequent site. Roentgenographically, the lesion begins as a tiny area of rarefaction at the terminal portion of a cranial vascular channel and gradually expands, fusing with adjacent rarefied areas. Later, areas of increased density appear, usually in the areas which were previously decreased in density. The squamous table thickens, and the outlines of the diploë, vascular markings, and suture line ultimately become obliterated. Contrary to opinion, the inner table is also involved. In late stages, the characteristic extreme thickening and "cotton wool" appearance occur.²² The disease is probably most easily diagnosed if the skull is involved. Although the squamous bones are most frequently involved, dentists are becoming more aware that leontiasis ossea, or cherubism as it is called in children, is a manifestation of Paget's disease. This condition is more frequent in young people and children and usually first presents as a painless enlargement of the alveolus of the molar region of the maxilla. In earlier cases, lamina dura around the roots of the teeth is absent. In the advanced stage, there is a hypercementosis of the roots.^{11,23}

Pelvis and spine. The disease is seen in the pelvis in 2 forms: (1) the sclerotic phase in which there is a homogenous density of the bone and (2) the combined phase in which the bones show areas of osteosclerosis, osteoporosis, and cysts.³ Sutherland³ emphasized the increase in dimensions of the bones. In the spine, an alteration in the density of the spinal body is the first change seen. Indeed, if there are not typical changes in other bones, Paget's disease of the spine may be difficult to diagnose.

Bones of the extremities. Seaman²⁴ and others have pointed out that the first demonstrable roentgenographic change in the long bones is acute halisteresis. This may be seen in the tibia as an advancing V-shaped osteoporotic area

sharply demarcated from normal bone. Subperiosteal thickening appears, and the involved area becomes coarsely trabecular. In the late stages, bowing may occur and fissure-like transverse lines of rarefaction may be seen on the convex side of the bone. Other involved bones of the extremities may reveal dense coarse trabeculae and considerably increased dimensions. Snapper²⁵ summarizes the roentgenographic features as follows: (1) thickening and broadening of the cortex (hyperostosis), (2) modification of the structure of the cortex (remodeling), (3) increased transparency of the bone due to loss of calcium (porosis), and (4) curving of the bone.

In the late stages of the disease, the bone may be very sclerotic and present an ivory-bone appearance.

PATHOLOGY

At necropsy, the involved bone is thickened and presents a rough and uneven surface.²⁵ The bone is less dense and is relatively soft. In the osteoporotic stage, it can sometimes be cut with a knife, and the involved area of the skull is highly vascular and red-violet in color. This prompted Schmorl⁶ to call the condition hemorrhagic infarction. On cut section, the compact bone is replaced by spongy bone of varying density, and the marrow cavity may be narrowed or obliterated. In the skull, the suture lines are obliterated in the involved areas, but, in the long bones, the disease process is limited by the articular cartilage and does not cross the joint space. Small pseudocysts may be seen, especially in the tibiae.²⁶

In normal bone histology, the bone lamellae are arranged in a regular fashion around the vessel-bearing haversian canals. Thin, regular, curvilinear haversian or cement lines, which stain blue with hematoxylin, are found between these bone lamellae. In the active stage of Paget's disease, the cortical bone takes on a moth-eaten appearance, the spaces being filled with edematous fibrous tissue. Numerous osteoclasts are seen eating away at the jigsaw of irregularly oriented bone trabeculae. The marrow is replaced by fibrous tissue. Areas of new bone formation are usually seen as evidenced by osteoblasts. Bone destruction and formation go on side by side. The area is hyperemic. One sees ill-assorted and disoriented blocks of bone composed of many irregular islands of newly formed bone glued together by heavy staining cement lines. This constitutes the classical *mosaic pattern* first described by Schmorl,⁶ which is seen primarily only in this disease.

PATHOLOGIC PHYSIOLOGY

The pathophysiology is most neatly elucidated by Albright and Reifstein.⁸ They consider the primary lesion to be vascular. There is a predisposition for the disease to develop in that part of the skeleton which is most subject to stress and strain, for example, the sacrum. The initial lesion is a localized factor causing bone destruction. It shows no respect for the structural requirements of the bone. The injured bone is more subject to stress and strain. To compensate for this, osteoblasts are stimulated to lay down bone matrix. When stress and strain are constantly present, as in the vertebrae and long bones, repair occurs almost simultaneously with bone destruction. In the skull, where there is little stress and strain, the bone repair lags far behind the bone destruction. Bone destruction and formation go on continuously as the "battle of the bone." The junction of new and old bone is demarcated by the cement lines. Since there is no order to the bone destruction, mosaic structure is seen.

VASCULARITY OF THE BONE

As it has been stated before, many believe that the primary lesion in Paget's disease is vascular. The hyperemic bone was noted by Paget. In actively affected bone, the overlying skin is warmed and doesn't cool on exposure. In actively diseased bone, Edholm and associates¹⁴ have shown increased bone vascularity and bone blood flow. The periosteal plexus is increased in size and has been demonstrated by postmortem injection and by antemortem angiography.²⁷⁻²⁹ With plethysmography, Edholm and co-workers¹⁴ approximated the normal bone blood flow in the human as being between 0.5 and 1.0 cc. per 100 cc. of bone per minute. In Paget's disease, they demonstrated that this flow may be increased upward of 20 times normal. In their patient, they found congestive failure, with a high output heart, high pulse pressure, and venous congestion. The arteriovenous oxygenation difference was lower than normal. These findings were consistent with arteriovenous fistula. Occlusion of the affected extremity with a cuff, as with closure of an arteriovenous fistula, did lead as expected to a slowed pulse, a rise in diastolic pressure, a decrease in right auricular pressure, and a higher arteriovenous oxygenation difference. However, histologic examination, arteriography, and dye curve studies²⁸ have failed to demonstrate an arteriovenous fistula in osteitis deformans.

BIOCHEMICAL SYNDROME

The serum calcium and phosphorus values are usually within normal limits. Some have re-

ported that the serum calcium tends to be in the lower normal range and the serum phosphorus in the higher normal range.³ The serum alkaline phosphatase is higher per unit of bone disease than any other condition and may be well in excess of 100 King-Armstrong units. In the absence of hepatic disease, serum alkaline phosphatase in an index of bone formation.⁸ When the disease is quiescent, the level may be near normal. Acid phosphatase is usually near the normal range. Rosenkrantz and associates⁴ noted normal blood counts, serum proteins, and cholesterol in most of their patients. Grainger and Laws³⁰ found a significant but small rise in the sedimentation rate when the disease was progressing. Albright and Reifstein⁸ have said that, with progressing disease, calcium and phosphorus excretion in the urine may be increased. Others have found that calcium, phosphorus, and magnesium retention occur.³ Serum citrate is somewhat elevated in the malady.³¹ Magnesium metabolism has been linked with the condition. Paget's bone is said to contain more magnesium than ordinary bone.³² It is believed that the presence of magnesium ions accelerates the action of alkaline phosphatase but retards calcification. Analysis of involved bone shows a higher concentration of organic matter.³ Calcium and phosphorus concentrations are decreased, and the alkaline phosphatase concentration is much increased. Williams³³ has concluded that the inorganic crystals of Paget's bone differ significantly from those of normal bone.

COMPLICATIONS OF OSTEITIS DEFORMANS

Cardiovascular changes. Sornberger and Smedal³⁴ have shown that the incidence of cardiovascular disease is appreciably greater in extensive osteitis deformans than among the general population and is manifested by cardiac enlargement and marked arteriosclerosis. These findings are directly related to the extent of the disease. In the most severe forms, cardiac enlargement and arteriosclerosis are nearly universal. The mechanism of enlargement was felt to be due to increased work of the heart because of the increased vascularity of the bones, increased arteriosclerosis, mechanical changes of the chest due to disease indirectly affecting the pulmonary circulation, and loss of elasticity in the calcified vessels. The cardiac output is markedly increased in some patients with the disease. It may be normal at rest but with exercise may become abnormally high. Howarth³⁵ states that the high output heart is not found in cases with less than 35 per cent skeletal involvement and a plasma alkaline phosphatase of less than 45 King-

Armstrong units. Sornberger and Smedal³⁴ believe that anyone with extensive disease should be considered as having "potential heart disease" and should be carefully followed.

Fractures. Fractures are probably the most common complications of Paget's disease. Lake³⁶ found 78 fractures in 255 patients admitted to the hospital with Paget's disease. A similar frequency was reported by Dickson and associates.³ The latter investigators found that a compression fracture of the lumbar and thoracic vertebrae occurred most frequently. Lake, however, believes this is untrue and feels that the most frequent site of fracture is the femoral bone, especially the proximal end. The fractures can be typed into fissure fractures, incorrectly called pseudofractures, and complete fractures. The former have been seen to progress to the latter but may heal of themselves or may remain as a permanent change in the bone. Complete bone breaks usually occur in two ways. Contrary to opinion, spontaneous fracture is not as frequent as supposed; a fair amount of trauma is ordinarily required to break the bone. The usual picture is the transverse "broken chalk" or "broken peeled banana" fracture. The fracture is more common in the osteoporotic bone, but a second type of fracture may occur through the V-shaped advancing edge of the rarefied bone of acute halisteresis. Healing of this latter type of fracture results in a more rapid progression of the disease in the fractured area.

In the vascular stage, callus formation is rapid and copious but may be retarded in the sclerotic stage. The soft, large callus formation is enhanced by movement at the fracture site and may itself participate in the Paget's disease process. More rapid union than normal was seen in one-third of cases, but, likewise, the frequency of delayed union or nonunion was also much higher. In some cases, internal fixation may be resorted to, and, because of the vascularity and softness of the bone, the procedure may be a trying experience to the surgeon. Early ambulation is advised; the reason for this will be discussed later.

Autogenous cortical graft was tried in 1 patient, and it survived for ten years.¹⁹ The end abutting the Paget bone later revealed some invasion. Thus suggested to the author that the disease is inherent within the affected bone and that the disease can be eliminated locally for a time.

Sarcomatous degeneration. Paget noted a high incidence of cancer in his patients. The incidence of sarcoma has been calculated variously between 2 and 15 per cent, but the lower number

is probably more nearly correct. Four-fifths of cases occurred in males. It is more frequent in the sixth decade of life and rarer in older age. Twenty-eight per cent of all bone sarcoma in people over 50 years of age was found to be associated with Paget's disease.⁹ It is interesting to note that the two peaks of frequency of bone sarcoma are seen in (1) adolescence and (2) the menopause. It is probable that osteitis deformans is present at least ten to fifteen years before malignant degeneration occurs. Actively growing vascular bone, androgenic activity, and trauma have been considered to stimulate the neoplastic change. Multifocal primaries are prone to occur in this disease. The femur is the most frequently affected bone. Sarcoma is said to arise more commonly in the vascular phase, and its origin is frequently subperiosteal. Anaplastic spindle-cell and round-cell types of osteosarcoma are the most frequent. However, fibrosarcoma, chondrosarcoma, and giant cell sarcoma are also seen. Prognosis is poorer than with the nonpagetoid sarcoma. Visceral metastases are sparse in pagetoid sarcoma. A rising phosphatase after amputation denotes a very poor prognosis. Magnesium level is very high in the neoplastic bone. Treatment other than amputation is usually futile. Careful observation of patients with Paget's disease for malignant changes is essential.

Neurologic changes. It is difficult to assess the mental deterioration of patients with Paget's disease because of the age group involved. The volume of the intracranial cavity is decreased in some.³⁷ Platybasia may occur because of the softness of the bones and may impinge on the brain stem. Deafness is a common symptom and is probably due to encroachment of bone on the nerve foramina. Otosclerosis has been thought to be a form of Paget's disease.⁵ Other cranial nerves are rarely involved. Compression of the spinal cord by collapse or impingement of involved vertebrae has been reported.³

Miscellaneous complications. Four to six per cent of the patients in the series of Rosenkrantz and associates⁴ and in Newman's series¹⁸ had associated urinary calculi. Little discussion of increased stone formation has appeared in the literature. It is known that immobilization leads to increased stone formation. Rosenkrantz¹ and co-workers⁴ series showed that 20 of 111 patients had salivary calculi. Two cases of metastatic calcification in the organs and soft tissue which were associated with Paget's disease have been reported.³⁸

DIFFERENTIAL DIAGNOSIS

The primary condition that must be ruled out is metastatic carcinoma. Clinical, laboratory, and

biopsy procedures readily serve to differentiate osteitis deformans and metastatic carcinoma in most cases.

TREATMENT

No good treatment for Paget's disease has been found as yet. Albright and Reifenstein⁸ believe that, since the lesion is one of increased bone resorption, agents which decrease the bone resorption should be administered. They advise increased intakes of calcium and phosphorus in the form of milk, and vitamin D supplements. Large doses of vitamin C seem to be of some help. Estrogens may be useful after the menopause. Magnesium carbonate was given to some with resultant symptomatic improvement. X-ray therapy has been used for relief of bone pain. Maudsley³⁹ has used epidural injections of Xylocaine to alleviate pain in the pelvis and lower extremities. Laminectomy may be required in cases with spinal cord compression.

Albright and Reifenstein⁸ have called attention to the dangers of immobilization of patients with Paget's disease. Despite the highly dynamic process going on in the bone, serum calcium and phosphorus remain in the normal range. When a patient is put to bed, the osteoblastic stimulus caused by stress is not present, and the osteoclastic process goes on with renewed vigor. This results in a very rapid rise in fecal and urinary calcium excretion. Alkaline phosphatase level is decreased in the bone and serum. The serum concentrations of calcium and phosphorus rise. The capacity of the kidney to excrete calcium may be exceeded, with resultant renal stones and severe hypercalcemia. Chemical death is thus a danger. If a patient must be immobilized, the calcium, phosphorus, and vitamin D intake must be decreased along with a high fluid intake to insure large urine volume.

More recently, the effects of ACTH and cortisone on Paget's disease have been determined.^{40,41} With high doses of ACTH, urinary and serum calcium excretions fell, and, much later, the alkaline phosphatase level decreased. Much higher doses of cortisone, 500 to 1,000 mg. daily, were required to suppress the phosphatase levels. Many patients experienced pronounced relief of symptoms. Skull biopsy at this time showed disappearance of osteoblasts and osteoclasts, with fat accumulation and loss of substance between the collagen fibers. There was a renewed evidence of hematopoiesis. With high dosages of cortisone, cardiac output returned to normal in those in whom it was previously elevated. This did not occur if the patient was on a maintenance dose of cortisone. The values also

tended to return to pretreatment levels after long-term treatment with steroids. No histopathologic changes were demonstrated in the vascularity of the bone after treatment. Spasm was postulated to be the cause for the increased vascular resistance and decreased cardiac output after treatment. Albright and Reifenstein⁸ didn't believe that corticoid treatment was of benefit in long-term treatment because of the side effects of corticoids, such as psychosis or osteoporosis, which resulted in compression fractures in previously normal vertebrae of 2 patients.

CASE REPORT

History. A 67-year-old, white, married, retired machinist from Austin, Minnesota, was admitted to Minneapolis Veterans Administration Hospital with the chief complaint of abdominal pain. He was in relatively good health until December 1958 when he noticed the onset of dull, constant epigastric distress without radiation, which began approximately one-half hour after eating and lasted several hours. There was no nausea or vomiting, but bloating occurred. He gave a history of fatty food intolerance. One week prior to admission, he had noted melena. He revealed no previous history of gallbladder, liver, or bowel disease. In recent months, he had noted cloudy and questionably reddish urine at times accompanied by an occasional burning sensation. He had an operation on his prostate in 1932. He had noticed increasing dyspnea on exertion, occasional anterior chest pain not related to exertion and without radiation and claudication. He had been hypertensive for an indeterminate length of time. He had noted progressive deafness for many years. He was not aware of any changes in the bones of his head or extremities. There was no known family history of diabetes, hypertension, or carcinoma; however, the family tended to be tall.

Physical examination. The patient was a well-developed, partially bald, elderly white male with prominence of the right frontal area of the skull. Initial blood pressure was 238/110; the pulse was 90. A small cataract was seen in the right lens. A grade II hypertensive retinopathy was present. His mouth was edentulous. The diaphragms were low and relatively fixed, and a few expiratory wheezes were heard bilaterally. The vital capacity was normal, the heart was not enlarged, and the rhythm was normal. A moderately loud, harsh systolic murmur was heard over most of the precordium. The liver edge was palpable 3 to 4 fingerbreadths from the right costal margin and was nontender. Testes were atrophic. The prostate was palpable and only slightly enlarged. Rectal examination revealed a stool positive for blood with guaiac reagent. The left tibia appeared enlarged and somewhat deformed. The pulses were somewhat decreased in the lower extremities. There was a more or less generalized subcutaneous lipomatosis. The skin over the left leg was noticeably warmer than on other parts of the body.

Laboratory findings. Urinalysis was normal. Urine culture was negative. Sulkowitch's test was 2—. Urine amylase and urine porphobilinogen tests were negative. A hemogram was normal, and the sedimentation rate was normal. Serology was negative. Bromsulphalein was negative. Glucose tolerance test was normal. Alkaline phosphatase was 130 King-Armstrong units with normal prostatic acid phosphatase values. Calcium was 9.3, and

phosphorus was 3.8 mg. per cent. Blood urea nitrogen was normal. An electrocardiogram was abnormal. Sinus tachycardia, occasional premature ventricular contractions, and a pattern consistent with left ventricular strain were present. A chest x-ray was essentially negative.

Hospital course. The patient was placed on an ulcer regimen. His gallbladder functioned normally and was without stones. Barium enema was normal. Gastrointestinal series revealed a moderate sized hiatus hernia and marked deformity of the duodenal bulb with a probable small, shallow ulcer. There was 34° free acid in the stomach after histamine stimulation. A skull roentgenogram revealed a diffuse, mottled sclerotic process involving mainly the right frontal region consistent with Paget's disease. Pagetoid changes were noted in the left tibia, also. The femoral arteries were calcified bilaterally. Regitine test was normal. During the hospital stay, the blood pressure fell to 160/80 on the average. An intravenous pyelogram was negative. Venous pressure was normal. Circulation times with Decholin were nine and six seconds, respectively. Circulation time with ether was less than six seconds. Oscillometry showed decreased pulses in the lower extremities, and the patient was started on vascular exercises. He remained relatively afebrile throughout the hospital course and gradually improved on ulcer management. However, he did complain of deafness and frequent swishing sounds in his head, which became very bothersome at times. Bilateral nerve deafness was demonstrated on audiometry. The patient was encouraged to ambulate as much as possible. Alkaline phosphatase values were noted to decrease, reaching a low of 77 King-Armstrong units. The calcium and phosphorus remained the same. Gastrointestinal series have been repeated.

SUMMARY

An attempt has been made to review at least some of the vast literature and to elucidate somewhat that which is thought by many to be a rather obscure disease.

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Current Treatment of Sinusitis

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THE GENERAL PUBLIC has many misconceptions about sinusitis, fostered in part by the prevalence of advertisements for proprietary remedies and in part by misapplication of the terms "sinus" and "sinusitis" by members of the medical profession. The most important and most frequently stated misconceptions are that the sinuses are responsible for any and all discomforts about the head and neck, that "sinusitis" is incurable, and that surgical therapy must be repeated throughout the lifetime of the patient.

Dorland's *Medical Dictionary* defines sinusitis as "inflammation of a sinus." In general usage, the term is limited to inflammation of the paranasal sinuses, which is the subject of this discussion. Headache and other symptoms should be classified according to their cause if treatment is to be effective.

ANATOMY AND PHYSIOLOGY

Consideration of the anatomy and physiology of the nose is requisite to an understanding of the sinuses and their reaction to infection.

The paranasal sinuses are air-containing cavities situated in the facial bones adjacent to the nose. They develop as evaginations of the nasal mucosa; hence, the mucosa lining the sinuses is continuous with and similar to that of the nose. The lateral wall of the nose is marked by 3 shelves, the turbinate bones, which are separated by recesses, the meatuses. The sinuses are anatomically grouped as anterior, consisting of the frontal; anterior ethmoid and maxillary, which arise from and communicate with the middle meatus; and posterior, consisting of the posterior ethmoid and sphenoid, which arise from the superior meatus. No sinuses arise from the inferior meatus, although this space has a common wall with the maxillary sinus. The ostia of the sinuses are protected from the respiratory air stream by their position in the meatuses. This avoids drying. The nasal mucosa, like that of the nose, is covered with ciliated columnar epitheli-

um and contains mucous glands. Mucous secretion is carried to and through the ostia by the action of the cilia, providing for drainage of the sinuses. The maxillary sinus, owing to its dependent position, may receive secretions from the frontal and anterior ethmoid and is thus especially susceptible to chronic infection.

Factors that serve to protect the sinuses from infection are the bacteriostatic action of the mucous blanket, the movement of mucus by the ciliary stream out of the sinus and toward the choana, the alternating positive-negative pressure of air in the nose which aids in emptying the sinuses, and swelling of the nasal mucosa which limits the volume of the air stream in unfavorable conditions.

PATHOLOGY

Sinusitis is divided into 3 classes: acute, subacute, and chronic. The dividing line between the classes is indistinct and is dependent largely on duration and on permanent changes in the nose.

Acute sinusitis is a self-limiting disease, usually accompanied by acute infection in the nasal mucosa. Symptoms are malaise, nasal obstruction, serous to purulent discharge, and pain and tenderness in the region of the affected sinuses.

Subacute infection results when resolution of acute inflammation is delayed by factors that impede drainage from the sinuses. These factors are anatomic obstructions, such as septal spur or cystic turbinate, or pathologic changes, such as edema, inflammatory swelling, or polyps. The symptoms are purulent or mucoid drainage; obstruction, which may be relieved by discharge of secretions; cough; pharyngitis; and sense of pressure in the face. Systemic symptoms are mild and pain unusual.

Chronic infection supervenes as a result of irreversible changes which permanently impair the drainage of the sinus. This may follow a single severe infection or repeated episodes of acute infection. Repair of the acutely infected sinus may be complete or may result in deleterious changes. Common changes are metaplasia of the epithelium with loss of cilia, subepithelial fibrosis, and vascular changes. The vascular

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changes are periarteritis with decreased tissue nutrition, periphlebitis, and perilymphangitis resulting in edema. The end result is fibrosis, which may be manifested as either atrophy or thickening of the tissues. Symptoms are persistent drainage and repeated respiratory infections. Pain is rare, occurring only with changes of pressure within the sinus.

Fluid and thickened mucous membrane within a sinus cause increased opacity, both to light (transillumination) and to roentgenograms. This is a great aid in diagnosis of sinusitis in any stage. Roentgen examination is more informative than transillumination.

Factors favoring infection are reduced resistance of the host, increased virulence of bacteria, breaks in the mucous blanket by drying, or obstructions. The nasopharynx is frequently the point of origin of upper respiratory infections. The absence of cilia in this area allows organisms to remain long enough to gain a foothold in the tissues.

Factors favoring chronic sinusitis are anatomic obstructions, such as septal deviation, cystic or hypertrophied turbinates, and enlarged ethmoid bulla; physiologic conditions, such as excessive drying; or pathologic conditions, such as polyps, hypertrophic or edematous mucosa, metaplasia of the epithelium, and metabolic or systemic disease. Chronic suppurative disease of the lower part of the respiratory tract causes repeated re-infection of the upper air passages.

TREATMENT

Treatment of sinusitis is directed toward elimination of infection and restoration of ventilation and drainage of the sinus. The therapy varies according to the stage of the infection and will be considered under 3 headings.

Acute infection. The patient suffering an attack of acute sinusitis is sick. Treatment starts with rest and supportive measures accompanied by appropriate drugs for control of pain. Adequate warmth and humidity aid in putting the nasal mucosa at rest.

Sulfonamides are inactivated by pus and are of limited value in sinusitis; antibiotics are much more effective. Most organisms causing acute infections of the upper part of the respiratory tract are sensitive to penicillin and the broad-spectrum antibiotics, so that treatment can be started with any of these drugs pending results of culture. The dosage should be sufficiently adequate to reach organisms situated in purulent exudates in the sinus and, therefore, should be at least double the dosage used for infection in tissues. Use of the drug should be continued until cul-

tures are negative or until well after all symptoms have abated.

Local therapy with vasoconstricting drugs aids drainage, but use of these drugs should be limited to five to seven days to avoid drug-induced edema of the mucosa. Astringents, such as mild silver protein (Argyrol), in a 25 per cent solution applied on cotton pledgets for twenty minutes produce shrinkage of the nasal mucosa and cause the mucous glands to empty. These effects outweigh the disadvantages of temporary suppression of ciliary activity.

The displacement treatment described by Proetz aids by flushing out the sinuses. The technic is as follows: The patient is placed on the table with his head hanging in a dependent position. A mild solution of a vasoconstricting drug, such as 0.25 per cent Neo-Synephrine or 1 per cent ephedrine, is instilled into the nose in sufficient quantity to cover the ostia of the sinuses. Negative pressure is applied intermittently to one nostril while the other nostril is closed and the patient closes the nasopharynx by repeating the letter "K." The negative pressure removes air and pus from the sinus. This is replaced by solution when the negative pressure is released. Antibiotic and chemotherapeutic agents applied topically are of limited value because of the short period of contact with the organism.

Local heat aids in relief of pain and congestion, and small doses of roentgen rays are effective for relief of severe pain arising from acute sinusitis.

Surgical treatment is contraindicated in acute infection except for trephination of the frontal sinuses in fulminating infection. The trephine opening is made in the thin cancellous bone of the floor of the sinus to minimize risk of osteomyelitis. Lavage of the sinuses is useful during the subsidence of the acute infection.

Subacute infection. Sinusitis in this stage causes less severe illness. Supportive measures are not necessary. Antibiotic drugs are useful but are best administered under bacteriologic control. Lavage of the sinuses is the most effective single means of treatment. The maxillary and sphenoid sinuses are readily reached by cannula for lavage, but the frontal sinus can seldom be reached and the ethmoid cells almost never. Owing to its dependent position, the maxillary sinus is most subject to subacute infection. Evacuation of the reservoir of pus in this sinus usually allows resolution of infection in the frontal and ethmoid sinuses.

Chronic sinusitis. Infection of the paranasal sinuses becomes chronic when some permanent

change prevents adequate drainage of the sinus. Treatment must restore drainage and ventilation or reinfection will ensue with each subsequent upper respiratory infection.

Surgical treatment is indicated in many cases of chronic sinusitis. It is directed toward establishment of new drainage pathways or elimination of factors obstructing drainage. The maxillary and sphenoid sinuses present large areas of common wall with the nasal chamber. Removal of this wall provides a large opening for drainage which seldom closes postoperatively. The walls of the ethmoid cells may be removed to create a single large cavity with free communication with the nose. The frontal sinus presents greater problems. The surgically created drainage pathway is long and narrow and must be lined with epithelium to prevent closure. Nasal mucosa is preferred to skin for this purpose. The mucosa lining the sinuses is removed only when extensively diseased.

Elimination of the obstruction preventing drainage may involve submucous reconstruction of the septum, removal of polyps, removal of hypertrophied mucosa, or a combination of these procedures. The turbinates are zealously preserved to avoid surgically induced atrophic rhinitis with its attending symptoms of dryness and crusting in the nose.

The choice of approach to the sinus depends upon the anatomic and pathologic conditions present. Both intranasal and external approaches to the sinuses are available. In general, more severe pathologic states or complex arrangement of the sinuses can be managed more successfully through the external approach, which allows direct visualization of the surgical field.

Special problems which influence surgical treatment of the sinuses are the rigid walls that surround the abscess cavity and prevent its collapse after drainage and the tendency of a concentric wound to close. The former requires wide opening of the infected space, the latter, lining of part of the circumference of the newly created opening with nasal mucous membrane to minimize contracture.

Nasal polyposis results from excess edema of the mucosa. Causative factors are allergy or infection or, more commonly, a combination of the two. The most common source of polyps is the mucosa of the ethmoid and maxillary sinuses

and of the middle meatus of the nose. The mucosa of these areas is highly vascular and lacks fibrous stroma which resists swelling.

Nasal polyposis is usually resistant to the customary therapy for allergies. Surgical treatment is generally necessary in extensive polyposis, and the degree of success in preventing recurrence is directly proportional to the thoroughness with which polyps and potential polyp-bearing mucosa are removed. Extensive surgical treatment applied early in the disease gives the best prospect of long-term relief with least damage to nasal function.

Mucocele of the sinus results from continued secretion of mucus after occlusion of the drainage duct of a sinus. It causes painless expansion of the walls of the sinus. The condition is called "pyocele" if the contents are infected. The frontal sinus is most frequently affected, and the first sign is displacement of the thin-walled floor of the sinus into the orbit. Treatment consists of creating an adequate drainage pathway to the nose.

Septicemia, meningitis, brain abscess, and osteomyelitis are fortunately rare complications of sinusitis owing to the effectiveness of the antibiotic drugs in preventing extension of the infection. When present, these complications are treated with large doses of antibiotic and, in selected cases, by appropriate surgical procedures.

Sinusitis is frequently found in association with chronic pulmonary disease, bronchiectasis, bronchitis, and asthma. Infected secretions are transferred in both directions via the air passages. Thus, the greatest benefit is derived when therapy is directed to both the upper and lower extremes of the air passages. Elimination of a focus in the sinuses often aids in control of but seldom cures infection in the lungs.

SUMMARY

Infection in the rigid-walled paranasal sinuses presents special problems in management. Therapy is most effective when individualized according to the stage of the disease and consists primarily of the use of antibiotics, temporary drainage by lavage, and permanent surgical drainage. The term "sinusitis" is loosely used and leads to much confusion on the part of patients. The results of treatment of actual infection of the sinuses are highly gratifying.

Diagnosis and Treatment of Myocardial Infarction

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THE DIAGNOSIS OF myocardial infarction, as with most other conditions in medicine, is made by the application of sound clinical judgment based on a careful evaluation of the history, physical findings, and pertinent laboratory data. The purpose of this presentation is to emphasize some of the practical features of the current concepts of diagnosis and treatment. Atypical symptoms, practical points in the physical examination, the proper application of laboratory tests, and, finally, acute and long range management will be considered.

The terms *coronary thrombosis* and *myocardial infarction* are often used synonymously. Actually, however, coronary thrombosis refers to a condition associated with an acute thrombotic occlusion of a coronary artery. This is important because some of the laboratory studies to be considered later detect the presence of necrotic heart muscle. *Acute* coronary occlusion due to a thrombosis usually results in *myocardial infarction* or the necrosis and death of heart muscle. The gradual occlusion does not necessarily do so. *Coronary insufficiency*, the most controversial term of all, is used here to indicate situations in which moderately severe and prolonged pain is *not* associated with acute thrombosis of a coronary artery or the formation of a large infarction. Coronary insufficiency may produce small focal areas of myocardial necrosis. Coronary insufficiency and coronary thrombosis are not the true diagnoses but are most commonly manifestations of *arteriosclerotic heart disease*.

CLINICAL PICTURE

Studies of the accuracy rate of diagnosis of myocardial infarction, when examples found at autopsy and unsuspected clinically are taken into account, show that the correct diagnosis is made in less than two-thirds of the cases.^{1,2} The chief factor responsible for the incorrect diagnosis in healed and acute infarcts was the absence of angina pectoris or a history of prolonged pain. The typical patient with steady, midsternal pain, which is unaffected by breathing or movement and radiates down the inner aspect of the left arm, whose skin is bathed in cold perspiration, usually presents little difficulty in diagnosis. Not infrequently, myocardial infarction presents an atypical picture, such as that of congestive heart failure, cerebrovascular accidents, postoperative shock, or that of pulmonary infarction. Any condition presenting severe chest pain or dyspnea, left ventricular failure, pericardial friction rub, or shock may be confused with myocardial infarction. Acute upper abdominal emergencies at times can also be confused, but careful history, physical examination, electrocardiograms, and other laboratory studies will frequently differentiate these. It is a wise practice to have electrocardiograms made not only preoperatively of patients with acute upper abdominal conditions but also postoperatively of patients in whom hypotensive episodes develop, since these are etiologically significant in infarction. Postoperative myocardial infarction is frequently undiagnosed because of the absence of pain due to analgesia. Cerebrovascular accidents are frequently associated with myocardial infarction, and it is good practice to routinely order electro-

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cardiograms of all patients with "strokes."³ The underlying atherosclerosis is common to both conditions. The hypotension associated with coronary thrombosis may cause ischemic changes or thrombosis in a sclerotic cerebral vessel. At times, a cerebral embolism from a mural thrombus occurs in association with an unrecognized myocardial infarction. On the other hand, these patients may have had typical chest pain, but, when the examining physician arrives, they are unable to give the pertinent history. Pericarditis also may be confused with myocardial infarction. However, in the former condition, the pain is frequently affected by changes in the patient's position, the friction rub is more constant, pericardial effusion is common, and electrocardiogram patterns help to differentiate the two conditions. Pulmonary infarction can cause great confusion, but frequently the pleuritic pain, the pulmonary and pleural changes, the demonstration of a source of emboli, and the electrocardiogram patterns help in the differentiation. Distinguishing massive pulmonary infarcts is largely academic because most patients die within a short time. Many studies show that most of those who die suddenly of myocardial infarction had a previous history of coronary artery disease.¹ Generally speaking, a greater awareness of the possibility of myocardial infarction in elderly patients with otherwise unexplained heart failure will lead to more correct diagnoses. So called "silent" infarctions do occur but are probably quite rare.

PHYSICAL FINDINGS

Typically, at the height of the attack, the patient appears profoundly ill. He may be very restless, or, if shock is present, prostration may be more in evidence. The pulse is rapid and weak, and the blood pressure is considerably lower than previous levels. Hands, feet, and nose may be cold. The skin is an ashen gray color and may be bathed in cold perspiration.

Heart tones are faint and a gallop rhythm is frequently heard. On careful, frequent auscultation, a pericardial friction rub may be heard during the first few days in about 25 per cent of the cases. Extrasystoles are common. Of the more important abnormal rhythms associated with infarction, auricular fibrillation is most common followed by ventricular tachycardia and auricular flutter. Rales in the lung bases are found frequently, and, at times, typical pulmonary edema with bubbling rales throughout both lungs is present.

Fever is almost constant in myocardial infarction but may be overlooked, especially when oral temperatures alone are taken or when tempera-

tures are taken too infrequently. In patients with shock or dyspnea, the oral temperature may be 2 or 3 degrees below the rectal temperature.

LABORATORY PROCEDURES

Laboratory procedures which help to determine whether true infarction of the myocardium has occurred are electrocardiography, the determinations of serum levels of enzymes, leukocytosis, the erythrocyte sedimentation rate, and the presence of C-reactive protein.

Nonspecific tests. Leukocytosis, like fever, is a fairly constant feature of myocardial infarction. The increase in white blood count is most frequently detected about the second or third day. Counts of 12,000 to 15,000 cells are common, but rises to 20,000 are not rare. There is an absolute increase in polymorphonuclear cells. The leukocytosis usually disappears after one week. Leukocyte counts taken daily for three days are reasonable when the diagnosis is in doubt.

The sedimentation rate is almost always increased after acute myocardial infarction. It is usually noted on the second or third day and persists for several weeks until the infarct has healed. Tests for the presence of C-reactive protein also become positive three days after myocardial infarction, but this test, the sedimentation rate, and the leukocytosis are nonspecific tests of myocardial necrosis.

Electrocardiography. Routine electrocardiograms properly done and properly timed disclose distinctive changes of myocardial infarction and fairly accurate localization in about 80 per cent of cases. Difficulties in this regard are encountered when multiple infarcts occur which neutralize each other's pattern. Digitalis effect also tends to neutralize the S-T deviations associated with myocardial infarction. The presence of bundle-branch block and atypical locations of the involved myocardium also presents problems in electrocardiographic diagnosis. In these situations, other laboratory studies, particularly the serum transaminase, have been very useful. Taking insufficient leads or improper timing of electrocardiograms in relation to the myocardial changes contributes to the failure of obtaining characteristic graphic documentation. The generally accepted routine electrocardiogram should contain 12 leads: 3 standard limb leads, 3 AV leads, and 6 precordial V leads in the positions of 1 to 6 inclusive. At times, in addition to these 12 routine leads, the electrocardiographer will suggest exploratory leads to better delineate the area of infarction. Time relationships are important. Usually, significant electrocardiographic changes appear within the first few hours. At

times, several days or even two or three weeks are required before diagnostic changes occur. It must be remembered that if the patient is clinically suspected of having had a myocardial infarction, he should be treated as such even if the initial electrocardiograms are normal. Therefore, serial electrocardiograms are extremely important. The frequency of serial electrocardiograms must be individualized. If the clinical findings strongly suggest infarction, daily tracings are indicated. After the diagnosis is clearly established, the frequency of tracings depends upon the condition of the patient.

The classic electrocardiographic signs of infarction are S-T segment elevations followed by symmetrical T wave inversions and the development of Q waves. The S-T changes are most transitory, while the T wave changes remain longer, but the Q wave changes are most likely to remain in a permanent record of the myocardial scar. The evolution or progressive change in patterns from day to day is essential to the diagnosis of *acute* infarction.

Finally, the electrocardiogram must be considered confirmatory of the clinical impression and should not supercede it. The severity of the attack is judged by the severity of the clinical manifestations and not by the extent of electrocardiographic alterations.

Serum glutamic oxalacetic transaminase. In the past few years, chemical tests of serum enzymes levels, which aid in the diagnosis of acute myocardial infarction have been developed. Serum glutamic oxalacetic transaminase (SGO-T) has been studied most widely.⁴ This enzyme is present in the highest concentration in heart muscle, skeletal muscle, brain, liver, and kidney in descending order of concentration. Acute injury or necrosis of the cells of these organs results in liberation of transaminase and other enzymes. The normal serum transaminase concentration is less than 40 units per milliliter. Four to six hours after myocardial infarction has occurred, the serum level of enzymes begins to rise. A peak level of 50 to 500 units is reached twelve to forty-eight hours after infarction and returns to normal in four to six days. The time at which the samples of serum are obtained is extremely important for the correct interpretation of the test. Early in the course of infarction, 3 serum levels at twelve-hour intervals are determined and are followed by 2 more at twenty-four-hour intervals. The rise of serum transaminase seems to correlate with the amount of infarcted myocardium. On the other hand, no significant rise is seen in angina pectoris. Increases in transaminase levels to over 40 units may be noted in

hepatocellular injury, trauma to skeletal muscle, acute pancreatitis, and myositis of several types. Acute pericarditis and pulmonary infarction may at times be associated with some rise in the transaminase level. The technic can be done simply in any clinical laboratory. When the test is employed at the optimal time and is interpreted in the light of clinical findings and other laboratory data, it becomes an extremely valuable aid in the diagnosis of myocardial infarction.

MANAGEMENT

The management of a patient with myocardial infarction is not a standard or routine procedure but must be tailored to the individual circumstance. However, some basic principles and specific recommendations are important for proper management.

General measures. It is very important to begin treatment as soon as the diagnosis is suspected. If treatment is delayed until the time-consuming diagnostic procedures show clear-cut evidence of necrotic heart muscle, valuable time will be lost and errors of omission will occur. It is perfectly reasonable to institute a full coronary regimen for a week or so before deciding whether the patient has a serious myocardial abnormality. If, after adequate diagnostic procedures have been performed, the patient's symptoms are found to be due to a cause other than myocardial infarction, he should be told frankly in order to dispel unwarranted fear of serious heart disease. Also, nothing is lost in treating patients with ischemic heart disease, short of infarction, with a full coronary regimen. The difference between the treatment of coronary insufficiency and myocardial infarction is one of duration and not of intensity of therapy.

Another important principle of therapy is to *rest the heart* as much as possible. The patient should be spared all physical exertion. To establish maximal rest, symptoms must be controlled. Pain, apprehension, and dyspnea are relieved by the administration of morphine sulfate in doses of 1/4 to 1/2 gr. subcutaneously together with 1/100 gr. of atropine sulfate. If the pain is not promptly relieved, 1/6 gr. of morphine may be given intravenously. If the pain is mild, weaker analgesics may be employed. Mild sedation alone is adequate if pain is not present. The patient should be transported to the hospital by ambulance. One hundred per cent oxygen is administered by mask, particularly if pain, shock, cyanosis, or dyspnea is present. After the acute stage, humidified oxygen may be given through a nasal catheter or administered to the patient in a tent until the symptoms are completely re-

lieved. Strict bed rest is absolutely essential in patients with acute infarction. Initially, if shock is present, the foot of the bed may be elevated, or, if heart failure is present, the head of the bed may be elevated.

In recent years, there has been a controversy over the relative merits of chair rest versus bed rest. Proponents of chair rest point out that cardiac catheterization studies show that in patients with diseased or normal hearts, the work of the heart is decreased with the patient sitting in a chair with his feet hanging down rather than lying in bed.⁷ I prefer to keep my patients in bed for about four to ten days and then, in uncomplicated cases, allow them to be helped into a chair at the bedside. The chair should be comfortable with a high back and comfortable arms. When the patient is tired, the chair with the patient in it is moved to the edge of the bed and the patient is helped into bed. A similar procedure is followed in the use of the bedside commode. Chair rest is not "early ambulation" but rather a better rest for the heart than bed rest. When chair rest is used, the patient, his relatives, and the hospital personnel must understand that this is not early ambulation or they may minimize the importance of rest. On the other hand, movement of all extremities while in bed is encouraged. In following this program, the physician should explain to the patient that the rest and marked restriction of activity are only temporary. Morphologic healing of infarction requires six weeks, and some explanation of this period of time required to heal the heart muscle and the concept of collateral circulation is necessary to forestall further anxiety and depression. A comparison of the patient's condition with that of a person with a broken leg is one possible means of explanation. The patient is told that if he had a broken leg, he certainly would not expect to walk while the bones remained only partially healed, but after good, firm healing had taken place, he would be able to get along normally. The period of rest must be individualized, but it is usually continued for four to six weeks and occasionally longer if complications are present.

The diet is initially limited to liquids, and the patient may be fed for the first day or so if his condition warrants. Later, food is allowed in the amount of 800 calories per day. A decreased amount of food is part of the picture of general rest for the heart. The circulatory burden of digestion is less and, therefore, the work of the heart is less. Furthermore, many of these patients actually need to reduce their weight. If heart failure is present, the amount of sodium in

the diet is also limited. After the first few days the care of the bowels becomes important. Constipation and fecal impaction should be avoided. The use of the bedside commode, mineral oil, or some of the newer preparations containing fecal softeners are helpful. Small enemas may be used, but strenuous cathartics should be avoided.

Treatment of complications. The prevention and prompt treatment of complications is important in reducing mortality. Rest for the heart is of prime importance in this regard. Because of their frequency the following conditions deserve specific consideration: (1) shock, (2) thromboembolism, (3) arrhythmias, and (4) heart failure.

1. Prompt treatment of shock is essential. Profound and persistent shock is associated with a high mortality rate. Morphine, oxygen, rest, and slight elevation of the foot of the bed may be curative. If the blood pressure remains over 90 to 100 mm. Hg systolic and pulse pressure, 30 mm. Hg or more, and there are no signs of cold, clammy, ashen-colored skin or anuria, no treatment is necessary. The presence of true shock requires vigorous treatment to raise the mean aortic pressure necessary for the perfusion of the coronary and renal arteries. One of the most widely used therapeutic agents is norepinephrine (Levophed). This agent, a potent vasopressor, is administered intravenously. One 4 cc. ampule is added to 1,000 cc. of 5 per cent dextrose in distilled water and administered through a needle or polyethylene catheter into the antecubital vein at a rate of 20 drops per minute. The rate may then be regulated to maintain a systolic blood pressure of 100 mm. Hg or, in previously hypertensive patients, 120 mm. Hg. If a flow rate of over 40 drops per minute is required, 1 or more 4 cc. ampules of Levophed may be added to the infusion bottle. The rate of flow is also determined according to the patient's fluid requirements. If the intravenous fluids need to be restricted to 1,500 cc. or less per day, as in patients with congestive heart failure, increased concentrations may be required. The chief disadvantage of Levophed is that extravasation may cause local ischemia and sloughing. In addition, Levophed should be withdrawn gradually or hypotensive states may recur. Metaraminol (Aramine) is a less potent but effective pressor agent, which can also be given intravenously, intramuscularly, and subcutaneously. Mephentermine sulfate (Wyamine sulfate) can also be given intramuscularly. The recommended dosages can be found in the directions accompanying the ampules. If shock persists in spite of large doses of pressor amines, intravenous infusions of 100 mg. of hydrocortisone may be added. Shock as-

sociated with rapid atrial fibrillation or flutter is an indication for the use of an intravenously administered, rapidacting digitalis preparation, such as Cedilanid.

2. The use of anticoagulants for the control of a thromboembolism has been associated with a decrease in morbidity and mortality. The value of anticoagulants in a controlled study of 1,031 cases of acute myocardial infarction was investigated by a committee of the American Heart Association.⁶ A mortality rate of 23.4 per cent was found in the untreated control group and 16 per cent in the anticoagulated group. In the control group, 26 per cent developed thromboembolic complications as compared to 10.9 per cent in the group treated with Dicumarol. Other fairly well controlled studies have supported these conclusions.⁷ The chief sources of thrombi are the intracardiac mural thrombi attached to the damaged endocardial surface and the thrombi in the peripheral veins. Thrombi are formed more frequently in severe cases complicated by shock, congestive heart failure, and arrhythmias. A lower mortality in mild, uncomplicated cases has led one group to advocate withholding anticoagulant therapy in such instances. The overwhelming evidence in favor of anticoagulants and the difficulty in determining mild from severe cases early in the course has led many to advocate anticoagulant therapy in all cases. This therapy should be started early because mural thrombi have been demonstrated within three days after myocardial infarction. Because of the time required for long-term oral anticoagulants to become effective, heparin should be administered promptly and be continued until the optimal prothrombin level is obtained by the simultaneous use of oral anticoagulants. Heparin in doses of 50 mg. is injected intravenously every four to six hours until the prothrombin time has been adequately prolonged, usually less than forty-eight hours. Other regimens employing subcutaneously or intramuscularly administered concentrated heparin are also effective.

A coumarin compound is started simultaneously with heparin. The widest experience has been accumulated with Dicumarol. This drug is administered in a dosage of 300 mg. orally provided the initial one-stage prothrombin time is normal. On the second day, 200 mg. should be given orally, and thereafter daily doses of 0 to 100 mg. are administered to maintain the one-stage prothrombin time about 2 to 2½ times the control level. This should be continued as long as rest is maintained. Warfarin sodium (Coumadin), which has a more rapid action, has been introduced more recently. Coumadin has the ad-

ditional advantage of being more predictable and, therefore, more easily controlled, and it may be given intravenously, intramuscularly, or orally. Initially, 35 to 50 mg. is given orally or parenterally followed by daily maintenance doses of 5 to 15 mg. Again, this depends upon the prothrombin level.

Obviously, precautions are required in the use of anticoagulant therapy. The physician should become familiar with the contraindications and have accurate daily determinations of prothrombin activity available. The anticoagulants are not given to patients with cerebral hemorrhage or with recent operations on the brain or spinal cord. In patients with hemorrhagic diathesis or potentially hemorrhagic lesions, such as ulcerative lesions of the gastrointestinal tract, such therapy should be deferred. In patients with renal insufficiency and those undergoing continuous drainage of the gastrointestinal or urinary tracts, anticoagulants are generally contraindicated. Pericarditis is also a contraindication because hemorrhagic effusion with tamponade may result. True infarcts with friction rubs also should be observed for this complication. Minor hemorrhagic manifestations, such as microscopic hematuria, mild bruising, or epistaxis, may be controlled by reducing the dose or by giving small doses of oral vitamin K₁ (Mephyton). In patients with preexisting liver disease or even in severe congestion of the liver, the initial prothrombin time may be elevated and a considerably smaller dose of anticoagulant is needed to obtain adequate prothrombin levels. If termination of anticoagulation therapy is indicated in the case of heparin, it can be done best with 50 mg. of a 1 per cent protamine sulfate solution administered intravenously. In the case of Dicumarol or Coumadin therapy, 50 to 100 mg. of Mephyton should be given slowly and intravenously or smaller doses, orally, depending upon the urgency of the bleeding. Also, when heparin and Dicumarol are administered simultaneously, the blood for prothrombin times should be drawn before the initial heparin is begun and at least four to six hours after the last dose of heparin.

Long-term anticoagulant therapy is also associated with a decreased mortality.⁸ However, such treatment has been experimental and associated with complications. In the light of present knowledge, it should probably be confined to cooperative, intelligent patients who survive severe or recurrent infarcts or in whom uncontrolled angina develops. The patient must be taught to recognize hemorrhagic complications, and regular observation by the physician is

essential. Prothrombin determinations are done every three days and later weekly and bimonthly in uncomplicated cases. In the future when safer drugs and simpler testing procedures become available, it is likely that more widespread long-term therapy will be advocated.

3. It is particularly important to promptly control arrhythmias associated with myocardial infarction. Ventricular extrasystoles may be the harbinger of a more serious ventricular tachycardia or fatal fibrillation. There is also some urgency in treating and preventing all disturbances resulting in rapid ventricular rate which promotes additional coronary insufficiency. A decrease in coronary artery flow is produced by irregularity of rhythm, particularly when this is associated with a decrease in blood pressure. Most coronary filling takes place in diastole. Therefore, because tachycardia results in a shortened diastolic filling time and because of the increased nutritional demands of the myocardium with tachycardia, severe coronary insufficiency is produced. Arrhythmias also contribute to circulatory collapse, but correction frequently results in a return of the systemic pressure to normal. If the hypotension associated with the arrhythmias persists for any length of time, it should be treated cautiously with pressor agents." The preferred therapy in rapid atrial flutter or fibrillation is a digitalis preparation given intravenously, particularly a rapid-acting glycoside such as Cedilanid. The prime objective is to slow the ventricular rate in an attempt to reduce the coronary insufficiency and restore the associated hypotension to normal. Digitalis is also used in supra-ventricular tachycardia if carotid sinus pressure fails to convert it to normal rhythm. Conversely, digitalis is contraindicated in ventricular tachycardia. Three to 6 gr. of quinidine sulfate given every four hours at least five times a day is frequently effective in controlling all ectopic beats. I frequently use 3 gr. of quinidine every four hours five times daily in patients with infarction in an attempt to prevent extrasystoles and arrhythmias. Although routine use is not widely accepted, I would recommend that it be used without hesitation in all cases of ectopic ventricular beats. It is also effective in converting atrial flutter and fibrillation to normal sinus rhythm after the rate has been slowed by digitalization. Frequently, however, the arrhythmias are transitory and convert spontaneously.

Procaine amide (Pronestyl) is also effective in terminating and preventing ventricular arrhythmias. Orally, it is effective in doses of 250 to 500 mg. every four to six hours. To convert ventricular tachycardia to normal sinus rhythm, I pre-

fer intravenous Pronestyl. It is administered slowly and intravenously at a rate of less than 100 mg. per minute while the rhythm is monitored on a direct-writing electrocardiographic machine. The injection is continued until the rhythm reverts to normal, which usually occurs with less than 1,000 mg. After conversion oral quinidine or Pronestyl in adequate dosage is used to maintain normal sinus rhythm.

Atrioventricular block may respond to atropine in doses of 1/100 to 1/30 gr. when this is caused by increased vagal activity. More frequently, however, the heart block is due to partial or complete interruption of the conducting tissue and sympathomimetic drugs, such as isoproterenol (Isuprel), administered either sublingually or parenterally are effective. If the block persists, intravenous hydrocortisone may be effective in restoring normal rhythm, presumably by reducing the inflammation of the injured conducting tissue. Recently, intravenous or oral molar lactate has been advocated for the treatment of this condition. Pronestyl and quinidine are contraindicated in atrioventricular block.

4. Heart failure associated with myocardial infarction should be treated in the conventional manner. Oral digitalis or, if necessary, the rapid-acting intravenous forms are used. In patients not receiving digitalis Cedilanid should be given slowly in intravenous doses of 4 cc. (0.8 mg.) and repeated in four to six hours. Then oral digitalis should be begun after twenty-four hours. I prefer to use only the amount of digitalis required to control symptoms, because, in myocardial infarction, digitalis is apt to produce ventricular arrhythmias. The administration of potassium may help to forestall this event and may be especially indicated if diuretics are used. In addition to digitalis and diuretics, sodium restriction, elevation of the head of the bed, and oxygen are indicated. If failure is acute, in addition to rapid digitalization, morphine may have to be administered, rotating tourniquets applied, and phlebotomy performed.

AFTER CARE

At the end of the fourth or fifth week progressive activity may be allowed to the point where the patient can care for his personal needs at home. At home he can gradually continue to do more provided he experiences little or no distress. After a short time he can climb stairs carefully, go for walks, ride in a car, and visit his friends. When he is able to exert himself comfortably to a point where he can do light work or engage in light recreational activities, he should be encouraged to do so. Depending upon the

energy requirements of his job, he should be able to return to work in three or four months. The outlook after recovery from acute myocardial infarction is today more favorable than was formerly believed. More than 75 per cent of those recovering from a first attack are able to return to work. Angina, congestive heart failure, and emotional factors are the chief reasons for disability following an infarction. The latter can be forestalled if the physician himself is optimistic about the patient's return to work and can communicate this optimism to the patient from the very beginning. Obviously, some patients with angina or congestive heart failure will not be able to return to strenuous activity even after full digitalization or medication with nitroglycerin or the long-acting nitrites, such as Peritrate. With the help of increased numbers of cardiac work classification units, which evaluate the patient's capacity for work, and vocational rehabilitation units, it is hoped that even larger numbers of postinfarction patients will be returned to a happier and more useful life.

Frequently, patients ask what can be done to prevent future attacks. The two main points of emphasis have been the dietary regulation of fat and long-term anticoagulation therapy. In recent years the relationship between cholesterol metabolism and coronary atherosclerosis has been studied intensively. The reason is that large amounts of cholesterol are found in lesions of arteriosclerosis. Similar lesions have been produced by feeding cholesterol to rabbits. Furthermore, conditions with associated hypercholesterolemia have shown an increased incidence of atherosclerosis. Attempts to reduce the serum cholesterol by dietary restriction of cholesterol were unsuccessful. Keys and his associates have shown that the serum cholesterol levels correlated more closely with the amount of fat in the diet.¹⁰ Still more recently, the type of fat was found to be important. Unsaturated fatty acids, such as linoleic acid found in corn oil, safflower oil, and soybean oil, were found to have a lowering effect on the serum cholesterol. Saturated fats raised this level. The ratio of unsaturated to saturated fats appears to be the most important factor. At present, it seems desirable to restrict the saturated fats, including the hydrogenated fats, in patients with coronary disease. When the serum cholesterol is high, corn oil given as a supplement for saturated fats has been effective in lowering the serum cholesterol.¹¹ Although the evidence of the beneficial effect of diet on coronary heart disease is circumstantial, I feel it is reasonable in the present state of our knowl-

edge to employ these measures in coronary patients with repeatedly high serum cholesterol levels. An additional reason for restricting the fat in the diet is found in recent studies which suggest that blood becomes hypercoagulable for several hours after a fatty meal.¹⁰

In addition to the experience with long-term coumarin anticoagulation mentioned previously, the use of long-term intermittent heparin administered subcutaneously has been studied. Engelberg and co-workers¹² reported using 200 mg. of heparin sodium subcutaneously twice a week over an eighteen-month period in a group of patients with known previous myocardial infarction. In the treated group there was one-fifth the mortality as compared to the saline treated group. This most fascinating study has not as yet been confirmed. Although these studies are promising, more comprehensive information must be acquired before widespread clinical use can be advocated.

Lay publications have stressed the fact that coronary heart disease is the most frequent cause of death in the older individual. This fact together with the premature publicity about recent advances, no matter how controversial, preliminary, or unconfirmed, leads patients to pressure the physician into immediate action. "More than ever before, the physician must seek to be properly informed, not by the press, but by authoritative, critical, and unprejudiced sources."¹³

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Diagnosis and Treatment of Chronic Coronary Disease

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THIS BRIEF REVIEW of the problem of coronary disease is limited to diagnostic and therapeutic procedures available to most physicians.

Pathologically, there may be no sharp dividing line between symptomatic and asymptomatic coronary disease. Surely, there must be various degrees of impaired coronary blood flow. The transition from normal coronary arteries to atherosclerotic vessels without symptoms and, finally, to the stage of symptoms is gradual. The classical symptom of coronary insufficiency is pain, which, as a rule, is retrosternal, sometimes epigastric, or in the left precordial area. The pain practically always follows physical exertion or excitement and is relieved by rest or nitroglycerin (glyceryl trinitrate). It may or may not radiate to the neck, jaws, arms, or back. Some failures in diagnosis result from not listening carefully to the patient's story, especially when the pain is atypical or when other disease is present. It is well to remember that pain other than that produced by angina pectoris may be relieved by nitroglycerin. The relationship of chest pain and nitroglycerin is so well known that patients unknowingly may mislead the physician and make claims which suggest the diagnosis of angina pectoris.

There are many unusual features about angina pectoris. Occasionally, the patient may have pain only in the morning after breakfast, while moderately severe exercise later in the day produces no pain. I know of a physician who can listen to the fights on the radio without experiencing pain but has angina if he watches them on television. Some patients experience pain after walking only a short distance; yet, after a brief rest, the same individual can walk long distances without pain. Cold weather may reduce the threshold for pain.

It is interesting and worthwhile to spend extra time listening carefully while the patient points

out the location of the pain and describes its type. Martin¹ describes the patient's use of gestures. Most patients will do one of the following: (1) place the hands in the area of the anterior axillary line and move them medially toward the midline, (2) place one or both hands across the lower sternum and sweep upward toward the neck indicating the course of radiation, or (3) place the flat or clutched hand across the sternum at the level of the second, third, and fourth ribs. The patient may refer to the pain as "deep" or "inside" or as a feeling of "tightness." This is different from the noncardiac pain which seems superficial. Frequently, the patient will point one or two fingers to a small area below or to the left of the breast. Noncardiac pain often is paroxysmal and "stabbing" or "sticking." I know of no good explanation for the short, superficial, paroxysmal "catch" which many people experience.

Unfortunately, the pain may be of such a nature that the patient either cannot describe it or misinterprets it. The physician may then seek objective evidence of coronary insufficiency. It is not unusual for patients with typical angina pectoris to have normal resting electrocardiograms. Occasionally, it is desirable to obtain objective evidence of coronary insufficiency to satisfy compensation claims. Most of the tests commonly used are based on changes occurring in the electrocardiogram after a specific amount of work has been performed within a measured period of time. Master's test is widely used. He recommends doing a "double" if the "single" is negative. The test has been described in detail.²

Master's criteria for abnormality consists of RS-T segment depression greater than 0.5 mm. in any lead. Flattening or inversion of upright T waves or an inverted T becoming upright as well as arrhythmias and bundle-branch block have all been considered criteria for abnormality.

Many authors are critical of Master's criteria and prefer depression of the RS-T segment greater than 0.5 mm. I agree with this criticism. Certainly, one would consider many tests abnormal

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when no good evidence of coronary insufficiency exists. Important points regarding exercise tests are:

1. RS-T segment depression of 1 mm. or more is desirable for abnormality.

2. Leads V_1 and V_3 seem most satisfactory and, as a rule, show a greater degree of RS-T segment depression than standard leads.

3. If the "single" Master is normal, a "double" may be indicated. A normal response does not necessarily exclude coronary insufficiency, and a small percentage of normal individuals have a "false positive" response. Unfortunately, this frequently occurs in tense and worrisome patients with chest pain, when it had been hoped that the results of the test would reassure both patient and physician that the pain was non-cardiac in origin.

4. The test should be performed quickly and accurately with a minimal delay between the end of exercise and the tracing. The heart rate should be increased at least 20 beats per minute after exercise.

5. Although it is a safe procedure, the test should not be done when the resting electrocardiogram is abnormal unless some specific indication exists. A physician should be present or nearby, and an emergency tray should be available.

6. The test is helpful in certain cases; correlation of symptoms with the electrocardiogram is the physician's responsibility. The test does not foretell the future.

Despite the limitations of medical treatment, it is well to remember that the physician's enthusiasm helps maintain hope and morale for a condition which everyone recognizes to be extremely serious. Most measures attempt to adjust a compromised blood supply to the metabolic needs of the myocardium.

GENERAL MEASURES

1. Advise weight reduction when indicated.

2. Relieve anxiety and nervous tension which frequently "trigger" angina. Attacks may be appreciably reduced by use of sedatives in tense individuals.

3. Angina following large or even ordinary meals may be decreased by eating four or five smaller meals. Pain even after a light breakfast may be prevented by taking prophylactic nitroglycerin before the meal.

4. Lipid-cholesterol-lipoprotein factors seem important, but how and which to treat have not been conclusively solved. Hypercholesterolemia in the younger individual should be treated. Nicotinic acid^{3,4} in a daily dose of 3 gm. pro-

duces a significant drop in serum cholesterol in many patients. These large doses even when taken after meals cause side reactions, and about one-third of the patients have to discontinue treatment. A low fat and low cholesterol diet is indicated. Unfortunately, confusing and conflicting opinions regarding the importance of fats and cholesterol have been aired in lay publications to such an extent that patients may be dissatisfied with whatever treatment is used.

DRUGS

It is well known that patients respond to drugs differently, and sometimes even a placebo will relieve pain. For that reason, one must be cautious in accepting any claims. The following drugs are currently in use for the relief of pain caused by angina.

1. *Coronary vasodilators.* The one reliable drug for relief of angina is nitroglycerin. The dose is established by trial. Patients frequently have erroneous ideas about nitroglycerin. Some think it is habit forming; others feel that, when once used, the amount has to be increased. In spite of documented evidence to the contrary, patients tell me nitroglycerin loses its effectiveness as it ages.

Erroneous ideas sometimes are responsible for failure to relieve symptoms, since the patient may wait until an attack has become severe. The drug should be used early in an attack; sometimes prophylactic use before meals may prevent pain.

The hope of physician and patient is that a good long-acting coronary vasodilator will be developed. Metamine, Paveril, Nitroglyn, and Peritrate are the ones widely used. Manufacturers' enthusiasm rarely is supported by clinical results. Russek and associates⁵ attempted to evaluate these drugs objectively by their modifying action on the Master two-step test in patients with known coronary disease. These authors felt that of the 4 drugs tested, Peritrate in a dose of 10 to 20 mg. showed improvement when the drug was taken on an empty stomach. The clinical response was markedly reduced when Peritrate was taken after food. Although other authors⁶ do not share such enthusiasm, it is my impression that Peritrate when taken on an empty stomach has value in reducing angina pectoris.

2. *Sedatives* frequently reduce anxiety and, in many persons, reduce the number of attacks. This probably accounts for the frequent combination with other supposedly vasodilator drugs.

3. *Heparin* has been advocated as a lipemia-clearing substance. Angina pains have been pro-

duced several hours after a fatty meal and were associated with postprandial lipemia. Intravenous injection of 5 to 25 mg. of heparin relieved 14 out of 15 attacks and reduced neutral fat and change in lipoproteins.⁷

4. *Induced hypothyroidism.* There are a few patients who are greatly disabled and uncomfortable despite other forms of medical therapy. Blumgart and associates⁸ reviewed records of 1,070 patients treated with radioactive iodine and found that 76 per cent of 720 patients with angina pectoris were improved. The authors state that patients in whom the disease has been relatively stationary for a year show most benefit. Hyperactive, tense patients are especially good candidates. Antithyroid drugs are generally available and theoretically should produce similar results. I have not been favorably impressed with this form of treatment. Dramatic improvement supposedly may take place before basal metabolism has changed. It is one of the many puzzling features of angina pectoris.

SUMMARY

1. Diagnosis of chronic coronary insufficiency as a rule is easily made from the patient's history.
2. The electrocardiogram frequently is normal even in typical cases.

3. Master's exercise test is simple, easily performed, relatively safe, and often indicated in the presence of equivocal history and chest pain. I prefer at least 1 mm. depression of the RS-T segment for a "positive" test.

4. Treatment consists primarily of adjusting work to the available blood supply of the heart. Numerous measures, such as weight reduction and sedation, help toward this goal. Nitroglycerin is the drug par excellence for relief of pain.

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SEVERE chest or epigastric pain does not always accompany prolonged myocardial ischemia. In many instances, myocardial infarction is discovered only by chance or routine electrocardiographic examination. Undoubtedly, unrecognized infarctions are slight, since complications such as shock, congestive failure, and arrhythmias, which would lead the patient to medical care, are absent. Unrecognized infarction is less frequently followed by angina pectoris than recognized infarction, supporting the suggestion that the pathogenesis of pain associated with angina is qualitatively similar to that of infarction, differing only in degree. Data also suggest that infarctions of the anterior left ventricular wall and septum or posterior wall are least likely to produce symptoms, but additional investigations must be made to confirm this finding. In a twenty-year study beginning in 1948, the following criteria were employed to detect otherwise unrecognized myocardial infarction.

- *Electrocardiographic evidence.* Diagnosis was based on changes in the QRS complex, particularly during the initial 0.04 second. The Q waves were usually developed sufficiently to indicate infarct to two interpreters. Alterations were defined as recent when S-T segment and T-wave changes were seen.
- *Clinical recognition.* Infarction was defined as unrecognizable when a patient with electrocardiographic evidence reported no illness, described symptoms that did not require medical care, or had consulted a physician because of significant symptoms that were misinterpreted.
- *Character of chest discomfort.* Oppressive substernal or midepigastria discomfort, with extension to the shoulders, arms, neck, or jaw, was considered typical. Any significant deviation was defined as atypical.

Of 73 middle-aged patients studied, myocardial infarction was clinically unrecognized in 15. Of these, 8 denied any precordial pain, 3 consulted physicians, and 4 had discomfort not requiring medical attention.

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Psychiatric Facilities and Future Possibilities

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A basic human need of every individual is to be a member of a family—to belong somewhere. Medical literature, historical documents, and diaries contain many references to the hallucinations, pathologic suspicions, depressions, unrealistic terrors, and other peculiar events experienced by individuals who have been isolated, such as explorers in the deserts and in Arctic regions, sailors marooned or confined for long periods of time to lifeboats, hermits, prisoners of war, and so forth. Similar sensations and psychotic episodes formerly occurred in 7 per cent of patients who underwent bilateral cataract surgery. The development of technics reducing the time required for blindfolds to be worn after such an operation decreased the incidence of psychotic reactions to only 1 per cent.

The effects of isolation are now undergoing extensive study and experimentation by medical teams in an effort to prevent such reactions—a necessary step in the preparation for space exploration. Children who spend their formative years in institutions develop more slowly and are less responsive than those brought up at home. Likewise, the adult who spends a long time in an institution usually loses the ability to socialize and, since opportunities for self-direction are lacking, becomes overly dependent and passive. In Europe, it has long been recognized that psychiatric patients recover more quickly with family care.

CONCEPTS

Many of the following paragraphs contain expressions and opinions of individuals who attended the Tenth Mental Hospital Institute.

People concerned with public mental hospitals and community psychiatric services have been slowly changing their concepts about how such facilities should operate and how psychiatric care should be made available. These changed

concepts are based on the belief that the conventional public mental hospital is not able to carry out its function of meeting psychiatric needs because of its size, its structure, its organization, and its inability to provide the types and quantities of personnel who are needed to carry out that function. Experimental procedures and isolated programs have shown that social manipulation can change the behavior of psychiatric patients.

That which brings a patient into a hospital may have little to do with medical illness. The primary purpose of a hospital is to treat, not to retain or incarcerate; yet, we have allowed ourselves to assume responsibility for large areas of human behavior that are not medical. Admission to the hospital rather than retention in the community is usually the result of the response of the family or the community to manifested behavior. Our failure to distinguish between the medical and social aspects of manifestations of psychiatric illness results in a confusion of our institutionalized modes of procedure. Often, they persist through inertia of custom and practice and have no logical justification. The majority of inhabitants of most chronic disease hospitals experience all aspects of life in the same general locus and under the technical, administrative, and, often, exclusive personal authority of one individual. Only two choices appear to remain open to the patient: (1) he may learn new skills that allay his anxiety and take his mind off his symptoms or (2) he may submit to regimented aggregate living and adopt an attitude of prone loyalty to—or defiance of—the authoritarian system in general. In order to secure lasting changes in specific treatment, attitudes, and procedures, we need a clear-cut philosophy of treatment that is operationally known to *all* in the hospital and to *all* in the community both in regard to its limits and its possibilities.

KINDS OF PSYCHIATRIC CARE

Increasing consideration is being given to whether hospitalization in a large public facility is indicated to the extent implied by admission

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figures. It is well known that large institutions, like our Jamestown State Hospital, carry a great number of individuals who are not receiving anything which could be called treatment. If intensive treatment is to be given, some difficult decisions must be made in the near future in terms of the chronic long-term patients for whom we are even now doing very little. These decisions must be made in the general philosophy of whether a psychiatric hospital is to stand for a specialized intensive psychiatric treatment center or a custodial and domiciliary institution. It cannot very successfully be both.

It will be necessary to provide other facilities for aged persons who are not in need of psychiatric care. Some other system, not just another large institution, should be provided for the chronically ill where they can receive care and adequate supervision and be under regimes of medical knowledge. This care would be a different type of medical psychiatric care than that practiced in the mental hospital giving intensive psychiatric treatment. Changes such as these, if adopted at the present time, would not occur overnight but would take from fifty to seventy-five years to accomplish.

Boarding home care is a loose term and can refer to a variety of plans ranging from nursing homes that care for an undifferentiated group of chronically ill patients who are unable to benefit from active therapy in a hospital to a single placement in a carefully selected foster family as the final step in rehabilitation. Recent advancements in psychiatric treatment have created a large group of patients who would benefit from community care if it were available. Surveys of hospital populations reveal that many long-term patients have passed the acute phase of illness and could benefit from community care if a plan could be made for them. Large numbers of patients, through being forced to live in wards with 50 to 100 other people, must adopt certain symptomatology as a protective device. This then becomes a vicious cycle as the very symptomatology adopted prevents release. If such persons could somehow be released, improved alertness, awareness, and function would result. Simply opening the doors of over half the wards of the Jamestown Hospital resulted in patients assuming much greater responsibility for their action and behavior.

Psychiatric hospitals are developing all sorts of new programs in an attempt to meet psychiatric needs and to avoid the ill effects of mass methods of control in large institutions. These include day care, night care, special program care, intermittent hospitalization, outpatient services

of a type different from conventional concepts, marital and family counseling, alcoholic follow-up, and so forth, all of which keep patients in close touch with the family and the community.

Even if differential treatment were the hoped for goal of the chronic hospital, the bulk of the patient body for various situational and organizational reasons is often treated alike. The habit of assessing the conduct of patients on the basis of vaguely defined social stereotypes, such as settled-down patients, soilers, problem patients, incurables, nonworkers, and so forth serves to confound the aims of true clinical practice. Since mental hospitals suffer from chronic shortages of space and staff, it is still not possible to provide the individual attention required by every patient. The fact that a patient has been twenty years in a hospital and would be unhappy away from it does not justify retention in a therapeutic setting from which he cannot benefit and which may, in fact, be damaging.

The patient who has been hospitalized for many years and whose family may be unwilling or unable to accept him back or who is without a family would, it is hoped, learn to conduct himself in a normal foster home in ways which would make him acceptable to those with whom he must live. He would learn to choose what he will eat and wear. He would decide how, where, and for what he will spend his limited funds. He would need to observe the usual courtesies in social intercourse. Without support and understanding, retreat to the less demanding atmosphere of the hospital where somebody will make all such decisions for him can be predicted.

The hospital of the community is one of the most fundamental of our social institutions. The voluntary hospital system has evolved so that it effectively handles the normal medical needs of the community and gives full support to the principles of individual responsibility. Unfortunately, something happens when the socioeconomic problems attendant to illness become too big. There is a complete break in the usually effective processes by which the community solves its problems. Responsibility is shifted from the individual to society collectively. There is a loss of personal concern. Government is depended upon for action. Agency officials are left without real personal interest and without professional guidance in their planning. The institution is expected to take full responsibility. Conformity of behavior has deplorably been sought to facilitate the operation of enormous and complex "homes" and hospitals. Identical meal times and meals, identical bed times, same hours for recreation, a sameness in clothing, and lack of

opportunity for choice in the many decisions incident to daily living on the outside all operate as dull depressants on the free resourceful human spirit. There is too little challenge and too few problems which must be solved by ingenuity and perseverance.

In seeking to relieve *excessive* stresses for persons unable to cope with them, we have too often produced a *stressless* situation as damaging as the one for which it has been substituted. The individual in the institution is unable to experience or express his individuality in such little but highly significant ways as deciding what time to get up, what paper to buy, what to eat for breakfast, what to wear, what work he will do, what recreation he will engage in, and with whom to associate in his leisure time. Everything is all marked out and decided. Institutional living, particularly for persons mentally or physically ill or limited, results in many intimate personal functions, which are ordinarily discharged by the adult for himself, being taken over or supervised by others much in the same manner in which they are supervised for children. This works against the patient's sense of himself as an adult and fosters distrust of his own judgment and capacities.

A children's inpatient psychiatric facility is needed to care for those children who need a brief inpatient treatment program. As a first step, the 1959 North Dakota State Legislature appropriated funds for salaries for clinic personnel to set up facilities for examination and treatment of children and to provide consultative services to the penitentiary, state training school, and other government facilities.

DEVELOPMENT OF COMMUNITY CARE

1. *Coordination of programs.* It will be necessary to organize and define responsibilities of some facility to coordinate the psychiatric services of the state hospital and the mental health programs being conducted by the several state and private agencies.

2. *Specific psychiatric treatment.* In the history of care and treatment of persons with psychiatric problems, there are numerous cases of persons who have responded excellently to various specific psychiatric treatment procedures. There are also a number of other persons who may have responded in some fashion to psychiatric care or treatment but who remained so disabled that they were in need of continued hospitalization. For these people, the hospital should provide a retreat or sheltered environment, but the hospital should be managed in a way that will not intensify their disabilities.

3. *Medications.* In the past few years, there has been a surge of excitement in the realm of medications directed toward psychiatric symptoms. In contrast to past disappointments, perhaps this time psychiatry is on the threshold of development of medications which can be used in the "care" of psychiatric patients. These medications may be used in continued treatment of the illness in much the same fashion as insulin, liver extract or vitamin B₁₂, and digitalis are used in the care of certain chronic physical diseases. Because of various apparently insurmountable limitations, many people need this kind of care rather than treatment that attempts to cure.

4. *Consultation.* Psychiatric consultation or psychiatric hospitalization may be proper as a first step in setting up a program for drug therapy. There may also be times when the physician is quite certain of the program to follow to provide such care but may wish psychiatric consultation to assure the patient or family that possibilities of cure are not being overlooked.

5. *Psychiatric technics in general practice.* In psychiatric presentations and discussions, an attitude toward the general practitioner has often been expressed in some such terms as "over half of the patients of a physician in general practice have mental or emotional problems, consequently he needs better preparation in psychiatric technics while in medical school." I, however, believe that the family physician has developed adequate psychiatrically oriented technics of treatment and management for patients having certain physical illnesses. Examples are: the careful preparation by the physician of his patients during pregnancy; the care, follow-up, and mental health measures he employs with hypertensive patients and those with gastric and duodenal ulcers and past coronary attacks; and the care he exercises in treating patients with obesity. Successful as the physician is with patients having these dual problems, he is perhaps less successful with patients who "have nothing wrong with them;" yet, the same technics with slight modifications are applicable. Such patients need discussion and guidance in regard to their problems of everyday living to the same extent that those with the previously listed physical illnesses require help.

SUMMARY

The present functions of large public psychiatric hospitals fail to meet the psychiatric needs of the community. Such institutions must be modified in both structure and function, but this will take decades to be noticeable. Various types of psychiatric services can be developed in the com-

munity. New developments may provide medications with which physicians may control, mask, alleviate, or prevent psychiatric symptoms. Basically, management and treatment of patients will be done by the physicians in the community. These physicians must be able to call upon several different specialized intensive psychiatric services when specifically needed.

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ALCOHOLISM is not rare; 1 of 16 adult drinkers may become alcoholic, and it is thought that there are approximately 4,000,000 problem drinkers in the United States. In most communities, the treatment of this problem is referred to the general practitioner or internist, who must attempt to prevent progression leading to the ruin of the patient both as an individual and as a member of society. A chronic alcoholic is an addict who can be recognized by his uncontrollable desire for alcoholic beverages, even in the face of interference with his health and success in life. When such a patient takes one or two drinks, he either refuses to stop or finds it impossible to do so. What does the pharmacology of alcohol contribute that renders certain individuals incapable of controlling their drinking habit? It is to ameliorate the emotional effects of unpleasant experiences in everyday life that the alcoholic turns to drink. The response to fear is anxiety or tension, and alcohol is one of the devices used by man to minimize these uncomfortable feelings. Its action releases him from his uneasy state and makes him feel content, even if this contentment is only temporary and exists on an illusory basis. Finally, in the confirmed alcoholic, the cells of the body, and particularly those of the brain, are altered. They function better with alcohol than without it, for sudden withdrawal causes abstinence symptoms including weakness, tremor, and perspiration. More grave results are vomiting, fever, tachycardia, and even convulsions and delirium.

In taking the patient's history, the physician should allow him to speak freely, throwing light on the series of events that has led to alcoholism. The best rapport can be obtained by listening rather than talking and, above all, withholding moral condemnation. The old viewpoint that alcoholism is moral delinquency and therefore punishable has given way to the realization that it is a disease that must be treated. Armed with the patient's history, the physician can attempt to remove factors which caused the alcoholism. Changes in interpersonal relationships, restoration of physical health, and motivation of the desire for cure are all helpful. A useful aid in the maintenance of morale is the administration of such drugs as disulfiram (Antabuse) and citrated calcium carbanide (Temposil). A real advantage afforded by these drugs is that the patient has to fight the desire for alcoholic beverages only once or twice a day rather than upon every instance of temptation.

H. E. HINWICH: The management of alcoholism, *Modern Medicine* 27:21, 1959, pp. 23-32.

Postgastrectomy Anemias

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NEITHER THE MEDICAL nor the surgical treatment of peptic ulcer is casual. The operative approach often leads to discomfort and injuries, and one of the harmful effects is the frequent anemia. This has been recognized as a complication for the past twenty odd years, but published observations, nevertheless, have often been decidedly varied and often virtually contradictory in regard to the incidence. Nevertheless, there is no question that with the increased utilization of the surgical approach during the past ten years, the number of complicating anemias is increasing. The postgastrectomy anemias, according to Hall's classification, would fall within the nutritional category.¹ They are typified by the common iron-deficiency anemia or the rare magaloblastic anemia.

IRON-DEFICIENCY ANEMIA

Iron-deficiency anemia is the usual type of anemia that occurs following gastrectomy. In order to better understand the physiologic alterations which gastrectomy lends itself to, a basic knowledge of the normal iron absorptive mechanisms is necessary.

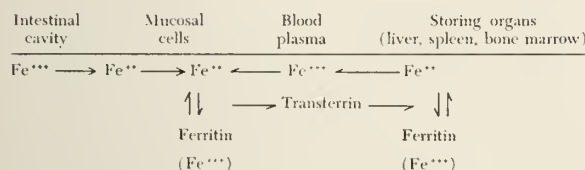
Normal physiology. Assimilation of iron takes place principally in the stomach and the small intestine, with an evident decreasing intensity of absorption from the pylorus to the colon.^{2,3} Granick's work suggests that the duodenum is the principal site.⁴ The degree of iron absorption is often conditioned by the needs of the organism. For example, acute blood loss or severe iron deficiency will generally provoke a sharp rise in the iron absorption curve. Absorption is 5 to 15 times normal following blood letting in experimental animals. Within four hours after the administration of oral iron isotopes, radioactivity may be demonstrated within the circulating erythrocytes. Appreciable hemoglobin synthesis following oral iron is often noted after three to five days. It is well recognized that iron absorption is generally

increased in deficiency states, reaching levels up to 66 per cent absorption of the total ingested amount. On the other hand, the normal animal absorbs from 1.6 to 6 per cent of the total ingested iron.⁵ In the normal human being, various investigators maintain that from 10 to 20 per cent of the total daily intake of iron is absorbed. In the human, iron transgresses the intestinal mucosa in only the ferrous form, while, in other mammals, ferric iron is also absorbed.

The normal gastric content possesses an extraordinary reducing ability, which is efficient at a low pH. Hydrochloric acid alone has been shown through in vitro means to split off alimentary iron. The enzyme pepsin enhances the process. The principal reducing substance is ascorbic acid, which alters the ferric iron to the ferrous state and, at the same time, plays a definite role in gastric secretory stimulation. Bile, too, through its action in neutral or slightly alkaline media, may help free alimentary iron. However, its effect equals less than half that of normal gastric juice. Experimentally, intestinal flora have been shown to play a definite role. Rabbits placed on oxytetracycline reduce their flora to mere *Proteus vulgaris*. Oral iron absorption at that point is virtually nonexistent and is reflected by the failure of the serum iron curve to rise with the administration of oral iron. Even bloodletting exerts no effect on iron absorption. When the animal subsequently receives enterococci and *Escherichia coli*, which are resistant to the antibiotic, the oral iron passes immediately into the circulation and is reflected by a sharp rise in the serum iron curve.⁵ Also, phytic acid or excess phosphorus may interfere with iron absorption.⁶ Iron absorption depends in part upon mucosal function itself. Apparently, the digestive mucosa contains a protein entitled apoferritin. Ferric iron in the hydroxide form combines with this substance to form ferritin.² This reaction is enzymically mediated and reversible. Iron itself introduced into the intestinal tract stimulates apoferritin formation. The ability of the organism to produce apoferritin is limited, and, when the eventual saturation of the apoferritin is achieved, iron may no longer be accepted until the ferritin

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abandons its iron into the circulating blood. This phenomenon was termed mucosal block by Granick. The illustration below summarizes this phenomenon.



Granick concludes, therefore, that iron absorption is limited by the velocity of the previously described reactions. However, recent work suggests that the mucosal block is far from complete, and other mechanisms must be involved.⁷

Incidence. Iron-deficiency anemia is the most common anemia associated with gastric surgery (table 1).⁸⁻²⁰ Procedures that most distort the normal anatomy are most frequently complicated by iron deficiency. In the Billroth type II procedure, ingested food stuff bypasses the entire duodenum and the proximal jejunum, where we suspect iron absorption is best mediated. Figures as high as 80 per cent have been offered on the frequency of anemia following the Billroth II operation, while anemia occurring after the Billroth I procedure is rarely noted.⁸ But then,

again, Brain²¹ claims that he saw no anemia in his series except in the immediate postoperative period. He regarded this as a result of direct blood loss with subsequent depletion of the iron stores. Rumball and Hasset⁹ followed 125 patients after Billroth II postgastrectomy operations. They noted 11 evidenced a moderate hypoferrinemia with normal hemoglobin and normal hematocrit readings; 18 showed definitely depressed serum iron and again normal hemoglobin and hematocrit readings; and finally, 14 patients displayed low values in all three parameters. Therefore, they found that one-third of these patients reflected low or borderline serum iron. They also reviewed 12 large series through 1956 and found that, of 1,785 postgastrectomy patients, only 239, or 13.4 per cent, depicted laboratory evidence of iron-deficiency anemia. Among their 12 groups, the incidence of anemia varied between 0 per cent in the largest series to 62.5 per cent in other series; but the majority of the groups reported frequencies greater than 20 per cent. Smith and Mallet²² reported that anemia had not developed in any of their 22 patients one to five years after Billroth I procedure, but that 5 of the 6 patients undergoing Billroth II repairs evidenced definite decreased iron absorption. Paulson and Harvey¹⁶ reported on 27 patients, all of whom had undergone total gastrec-

TABLE 1

Author	No. of patients	Operative procedure	Megalo-blastic anemia	Iron-deficiency anemia	Interval (years)
MacLean ⁸	1,550	Subtotal (75 to 90%)	13		2 to 12, mean 6
Remy ⁹	104	Subtotal		44 (43.5%)	
Wells and McPhee ¹⁰	75	Subtotal (1 Billroth II)	1	15 (20%)	
Kourias ⁹	600	Subtotal		47 (8%)	
Blake and Rechnitzer ¹¹	104	Subtotal		44 (42.3%)	
Morey and Plummer ¹²	74	Subtotal		3 (4%)	
Mason et al. ¹³	24	Subtotal		15 (62.5%)	
Rumball and Hasset ⁹	125	Subtotal		43 (34.4%)	
Krause ¹⁴	151	Subtotal		56	
Lyngar ¹⁵	146	Subtotal		33	1 to 6, mean 3
Paulson and Harvey ¹⁶	27	Total	19		5 to 7, mean 3
MacDonald et al. ¹⁷	6	Subtotal	6		2 to 17, mean 8
Welborn et al. ¹⁸	10	Total, 5; subtotal, 5	10		1 to 10, mean 4.5
Blake and Rechnitzer ¹¹	11	Total	7	2	1 to 7, mean 3
MacLean and Sundberg ¹⁹	11	Total	10		3 to 7.5, mean 4
Macintyre and Stent ²⁰	100	Partial	2	42	0.5 to 10, mean 4

tomy for malignancy. Within two to three months postoperatively, iron-deficiency anemia with positive tests for occult fecal blood appeared in all of the patients. The anemia was believed to originate from the anastomosis site and responded well to oral iron. MacIntyre and Stent²⁰ surveyed 100 patients in whom Billroth II operation had been performed. They found 44 cases of anemia. Of these, 14 were reported to be normochromic-normocytic; 19, hypochromic-normocytic; 9, hypochromic-microcytic; and the remaining 2, macrocytic. Practically all of those in the first category were women, and the overall incidence in women was the same as in men. This is contradicted by Lyngar's¹⁵ series in which he noted anemia in 43 per cent of the women and 15 per cent of the men. Blake and Rechnitzer¹¹ noted that 59 per cent of the women patients under age 50 evidenced anemia, while only 40 per cent of those beyond this age were anemic. Most of the authors suggest that there is no good correlation between the date of surgery and the interval of time before iron-deficiency develops. MacIntyre's series gave intervals from five months to 10 years.

Pathological physiology. The basis of the iron-deficiency anemias are far from clear and no complete agreement concerning the fundamental mechanisms can be found. Its frequency, however, is directly proportional to the degree of the resection.¹¹ Also, as previously mentioned, the type of procedure influences the incidence. Moore²³ believes that iron-deficiency anemia rarely, if ever, is due to poor nutrition alone. Utilizing absorption studies, food impregnated with radioactive iron, he concluded that the average normal man absorbs 10 per cent of the iron in a normal diet per day, or approximately 1.2 to 1.5 mg. On the other hand, he excretes approximately 1 mg. per day or less, so that a positive iron balance is maintained. Theoretically, it would take 6 years in a man and 4 years in a woman for iron-deficiency anemia of 7.5 gm. per cent hemoglobin to develop. This assumes that no iron would be absorbed at all. Since most of these anemias take much less time to develop, Moore assumes that, in the presence of poor nutrition or malabsorption, occult gastrointestinal bleeding occurs. This, in his opinion, is the major factor. Other investigators studied radioactive ferrous sulfate through its administration in partially gastrectomized patients five years postoperatively. They found no gross impairment of iron absorption and concluded that occult blood loss from the alimentary mucosa was the cause of the anemia. Similar studies in the immediate postoperative period evidenced normal iron ab-

sorption.^{22,24} Baird and Wilson²¹ demonstrated that, in partially gastrectomized human beings, iron absorption was not impaired in the fasting state. But, on addition of food, iron absorption was decreased proportionately to the size of the meal. Other dietary factors, particularly deficient protein intake, may influence erythropoiesis. Wisler and associates²⁵ have demonstrated this quite adequately in the rat. Kiekens and Lundh²⁶ have demonstrated by utilizing transintestinal intubation technics that, in the Billroth II procedure, there exists an incoordination of gastric emptying with both biliary and pancreatic secretions. This may reach the point at which the majority of food rapidly passes through the intestine without any admixture with bile and pancreatic enzymes, resulting in incomplete absorption of both fat and protein. Similar procedures performed in patients who had had Billroth I operations revealed no abnormalities. Also, secondary alteration in bacterial flora, high digestive pH, achlorhydria, and increased transit time have been incriminated by others as predisposing factors.²⁷

MEGALOBlastic ANEMIA

Megaloblastic anemia is far less common in post-gastrectomy patients than iron-deficiency anemia, but, nonetheless, megaloblastic anemia is gradually assuming increasing importance with increased postsurgical longevity. Attempts have been made to produce megaloblastic anemia in experimental animals through gastrectomy, but the only anemia yet produced is that of iron-deficiency.¹¹ When megaloblastic anemia does occur in the gastrectomized human being, it is indistinguishable from pernicious anemia.^{18,28}

Unfortunately, many of the articles to be touched upon have not included serum B₁₂ assays or bone marrow procedures, so that, in the absence of such studies, it is difficult to concur with the authors that peripheral macrocytosis and megaloblastosis are synonymous. Certainly, macrocytosis can and does occur in many situations apart from pernicious anemia.

Incidence. When incidence of megaloblastic anemia is reviewed, consideration of the surgical procedures assumes prime import. There is general agreement that the condition is exceedingly rare after distal subtotal gastrectomy, while, on the other hand, it is quite frequent after total gastrectomy and proximal subtotal gastrectomy with esophagoantrostomy.⁸ Lowenstein²⁹ noted normal B₁₂ absorption in 19 partially gastrectomized patients. Badenoch and associates³⁰ feel that megaloblastic anemia is inevitable if the patient survives six years or longer after total

gastrectomy. MacDonald and coworkers,¹⁷ described megaloblastic anemia in 44 per cent of their patients who survived three years or more after total gastrectomy. They felt that anemia rarely develops earlier than two years postoperatively. Also, they described some 46 cases gathered from the literature, 12 of which evidenced a blood picture very suggestive of pernicious anemia. Dreher³¹ reported on 13 cases of macrocytosis in a series of 101 patients who had had various forms of gastric surgery.

In subtotal gastrectomy, megaloblastosis is rare but, nevertheless, present at times. Some individuals believe that its occurrence in this situation is merely chance phenomena. The majority of these people elicit no family history of pernicious anemia, and the original resection specimen is histologically normal. Welborn and associates^{18,32} found a complete absence of megaloblastic anemia among their 253 patients who underwent subtotal resection. If anemia does occur, they feel that factors other than the surgery itself, that is, malnutrition, diffuse gastrointestinal disease, and so forth are responsible. MacLean⁸ noted that, of 1,550 patients studied, only 9, or 1 per cent, had evidence of megaloblastic phenomena. In contrast to the rest of the group, all of these patients initially evidenced, in the resected specimen, chronic cellular infiltration, intestinal mucosa, absence of parietal and chief cells, and atrophy of all layers. He believes that predictions of eventual megaloblastosis can be accurately made by histologic examination of the resected stomach. Badenoch and associates³⁰ reported 6 cases of megaloblastic anemia that appeared two to seventeen years after subtotal resection. Supposedly, if the mucosa is healthy at the time of surgery, megaloblastic anemia should not develop providing that a portion of normal fundus equal to about 10 per cent of the original total gastric mucosa is left.⁸

Pathological physiology. If the intrinsic factor is produced solely by the stomach, total gastrectomy should be followed regularly by the development of pernicious anemia.¹³ The fact that this does not always occur suggests the possibility of extra gastric sources of the intrinsic factor. Certain animal intestinal extracts, such as hog intestinal tract, duodenal juice of swine, and so forth, have been shown to effect a hematologic response in patients with pernicious anemia. Votila³¹ supposedly prepared extracts of human ileum and produced a remission in 2 patients with pernicious anemia. Larsen⁶ disagrees with the prevailing opinion suggesting that the absorption of vitamin B₁₂-like iron takes place

chiefly in the duodenum. He further postulates a mechanism similar to that of iron resorption wherein vitamin B₁₂ combines with a protein apoerythrin to form erythrin, which is identical to the intrinsic factor. Vitamin B₁₂ is then subsequently released into the blood stream. Paulson and associates³³ administered upper intestinal secretion of a totally gastrectomized patient to a patient with pernicious anemia and failed to note a hematologic response. Most authors³⁴ feel that there is no extra gastric source of the intrinsic factor and that, assuming total gastrectomy has been performed, the primary factor is time. Serum B₁₂ levels have been shown to decrease progressively after total gastrectomy. Many individuals who undergo total gastrectomy are suffering from malignancy, and, consequently, the average survival time is quite limited. The usual lapse of time required after operation before anemia, macrocytosis, and megaloblastosis appear is assumed to be a function of adequate body stores of B₁₂. Supposedly, the normal daily requirement is approximately 1 µg. per day, and the body stores contain 1,000 to 2,000 µg. Therefore, three to six years would be required to exhaust those stores.³⁵ However, recent work suggests that the body content is more like 4,000 rather than 2,000 µg.³⁶

Alteration in the bacterial flora has also been incriminated. Studies of the fecal flora in pernicious anemia have revealed multiple organisms, particularly *E. coli* and *Clostridium welchii*. It is suggested that the change in the flora may eliminate certain organisms that conceivably synthesize vitamin B₁₂ or, on the other hand, provide a preponderance of organisms which destroy it or prevent its absorption. Toxic bacterial products might also play a role. Lichtman and associates demonstrated submaximal improvement through the utilization of oral Aureomycin followed by oral vitamin B₁₂ in 4 patients with pernicious anemia.³⁷

THERAPY

The treatment of anemia depends primarily on the type. In iron-deficiency anemia, of course, iron is indicated. Usually, the oral route is adequate; however, in some instances, parenteral administration is necessary because of the failure of adequate absorption.

Megaloblastic anemia generally responds to administration of parenteral vitamin B₁₂. Some authors recommend prophylactic treatment of anemia occurring after total gastrectomy and high subtotal gastrectomy.

CASE REPORT

History. A married, 66-year-old, retired railroad man entered Minneapolis Veterans Administration Hospital

on February 13, 1959, for treatment of anemia. The patient had an 85 per cent Billroth II resection in April 1950 at this hospital for undifferentiated carcinoma of the pylorus. Negative nodes were noted at the time of surgery and exploratory laparotomy two months later revealed no activity. Since that time, he has been followed by the surgery clinic at this hospital. In 1955, the patient had a bilateral inguinal herniorrhaphy for hernia which had been present for some thirty-odd years. On this admission, his only symptom was weakness. There has been no weight loss and no complaints referable to the gastrointestinal tract. During the past year, the patient has been on 0.3 of a gm. of ferrous gluconate three times a day.

Physical examination. Physical examination revealed a rather cooperative, elderly, white man with a normal blood pressure and a normal pulse which was regular. The positive findings were minimal concomitant convergent strabismus. Pale mucous membranes were evident. There was a slight left septal deviation. The patient was edentulous. The liver was down 2 to 3 fingerbreadths with a smooth edge and was not tender. Some guarding was noted in the right upper quadrant with no rebound, and a scar secondary to his abdominal surgery was evident in the left upper quadrant. Bilateral herniorrhaphy scars were also noted. Two plus benign prostatic hypertrophy was elicited on rectal examination.

Laboratory findings. Urinalysis was negative. Admission hemoglobin was 918 gm. per cent. Platelets were normal. Sedimentation rate was 30 mm.; hematocrit reading, 35 per cent; mean corpuscular diameter, 7.1; mean corpuscular volume, 76.5; mean corpuscular hemoglobin, 21.5; and mean corpuscular hemoglobin volume, 28.5. Color index was 0.75. The reticulocyte count on admission was 2.1 per cent. Screening tests for fragility were negative. Acid and alkaline phosphates were negative as was cholesterol, bilirubin, and cephalin flocculation. Blood urea nitrogen was 27 mg. per cent. Stools for blood x 3 were negative. Serum transaminase ran approximately 17 units x 3. An electrocardiogram was reported normal. Gastrointestinal series was negative as was an anteroposterior roentgenogram of the chest. Bone marrow revealed absence of particulate iron. Gastroscopic examination was reported negative. Plasma proteins were also reported normal. Serum iron was 22 µg. per cent; unsaturated iron binding capacity, 350 µg. per cent; total iron binding capacity, 372 µg. per cent; and saturation, 5.9 per cent.

Hospital course. On February 24, the patient was started on 100 mg. of iron per day intramuscularly. This was continued through March 20. On the iron therapy, the patient did extremely well. His reticulocyte count rose after a few days to approximately 5 per cent, and his hemoglobin steadily rose to a high of 13.2 gm. per cent. Repeat bone marrow at the termination of therapy evidenced particulate iron. The patient felt well. The fatigability, which was his presenting complaint, improved with a rise in hemoglobin. He was discharged and was to be followed by his local doctor. He was readmitted for further studies in regard to his anemia on April 6, 1959. His hemoglobin at this time was 14.2 with a hematocrit reading of 44.5. The reticulocyte count was reported as 6.6 per cent, and cell indexes were as follows: mean corpuscular diameter, 7.6; mean corpuscular hemoglobin, 27.5; mean corpuscular hemoglobin volume, 32; and mean corpuscular volume, 87.

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Significance of the Newer Diagnostic Tests for Rheumatoid Arthritis

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IN THE LAST DECADE, there has been extensive investigation of the property of sera from patients with rheumatoid arthritis to cause agglutination with properly sensitized systems. It has been shown that sensitized sheep cells,¹ tanned erythrocytes treated with human gamma globulin,² sensitized bacteria,³ and latex⁴ or bentonite⁵ particles treated with gamma globulin all develop agglutinative properties when mixed with sera of rheumatoid patients.

The mechanism of these agglutinations is a combination of a small molecular weight gamma globulin (designated S_7) with a macroglobulin (designated S_{19}). In the system employing erythrocytes, the S_7 gamma globulin is adsorbed to the erythrocyte in one instance by utilizing subagglutinating amounts of erythrocyte antibody and, in another, by chemical alteration of the erythrocyte membrane with tannic acid so that S_7 gamma globulin becomes adsorbed to the surface. In a similar manner, subagglutinating amounts of S_7 specific antibody can be adsorbed on bacteria, and such bacteria exposed to sera of patients with rheumatoid arthritis then agglutinate by a mechanism of combination of S_7 and S_{19} gamma globulins.

Recently, it has been shown that latex or bentonite particles can adsorb S_7 gamma globulins and that these particles agglutinate in the presence of the S_{19} gamma globulins found in patients with rheumatoid arthritis.

A schematic representation of this phenomena is shown in figure 1 in which the reaction of sensitized erythrocytes, sensitized bacteria, and latex particles is illustrated. Sera with these agglutinating properties can be shown to contain an S_{22} macroglobulin which exists as a complex of the two gamma globulins.⁶ Indeed, in some sera with a high titer of the rheumatoid

factor (S_{19} gamma globulin), spontaneous precipitin formation may occur; or precipitin may be induced in these sera by adding S_7 gamma globulins.⁷ It thus appears that the use of matrices, such as properly prepared erythrocytes, or bacteria or inert materials, such as latex or bentonite, supplies a template by which such protein combinations become apparent.

We have found, as have others,⁶ that the rheumatoid factor has a wide distribution among the plasma protein components. Figure 2 shows the results of starch electrophoretic separation of the serum. In these experiments, the serum components are separated by starch electrophoresis in a barbital buffer of pH 8.6. Subsequent elution of the proteins from the starch then permits analysis of their agglutinating characteristics. It will be seen that agglutinating substances for sensitized latex are present in both the gamma and the beta globulin peaks.

The complex of two gamma globulins in patients with rheumatoid arthritis raises speculation whether this reaction might not be considered to be an autoimmune mechanism. With this in mind, considerable investigation of this phenomenon is now being carried out. It is known that the gamma globulins of normal sera contain about 90 per cent S_7 components and about 10 per cent S_{19} components.⁸ The sera of patients with rheumatoid arthritis have increased concentrations of S_{19} globulins. A fraction of this macroglobulin moiety at least acquires the aforementioned property of combining with the S_7 component. Recent observations by Kunkel and associates,⁹ utilizing serologic, biochemical, and ultracentrifugal technics, have failed to demonstrate any qualitative differences between the S_{19} globulins isolated from arthritic patients and those existing in normal individuals. In Vaughan and Harris's experiments,¹⁰ in which plasma containing high titers of rheumatoid factor (S_{19} globulin) was transfused into nonrheumatoid subjects, a positive test for the rheumatoid factor could be produced and an appreciable titer was maintained for several weeks. It

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SCHEMATIC REPRESENTATION OF RHEUMATOID FACTOR REACTIONS

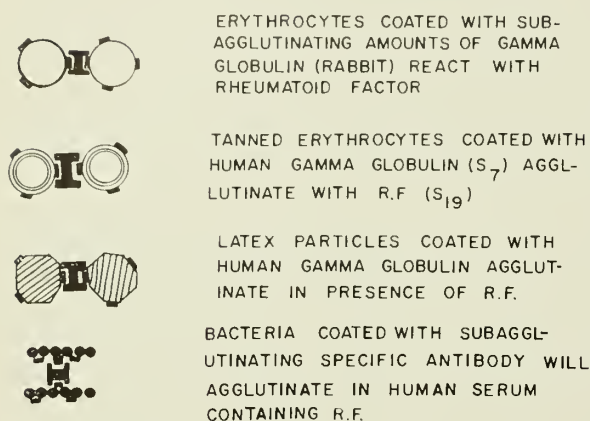


Fig. 1. Schematic representation to show similarity of reaction of the rheumatoid factor with gamma globulin in different test systems.

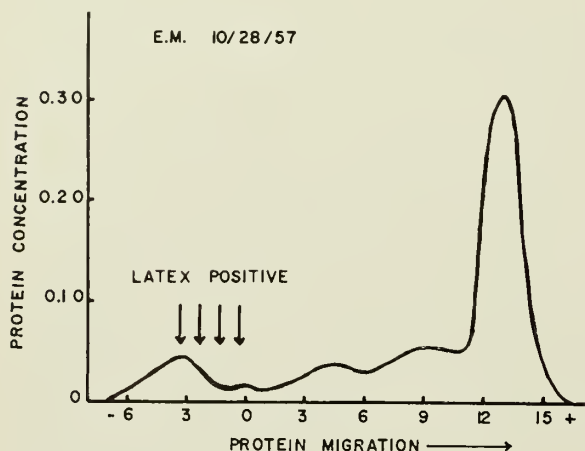


Fig. 2. Starch electrophoresis of human serum in barbital buffer of pH 8.5 and ionic strength 0.1. Each of the eluates from the starch block were tested for the rheumatoid factor. It is seen that the rheumatoid factor is present in both gamma and beta globulin fractions.

is significant that no evidence of any joint disease resulted. Ziff and associates¹¹ observed a high incidence of positive latex agglutinations in sera obtained from asymptomatic relatives of patients with rheumatoid arthritis. We have found, as have other investigators, that the rheumatoid factor is often undetectable in sera of patients with rheumatoid arthritis during the first year of their illness. Such observations suggest that the rheumatoid factor, which behaves *in vitro* as an autoantibody against human gamma globulin, does not seem to be causally related to the clinical expression of rheumatoid arthritis.

The sensitized latex test affords a convenient and sensitive method by which the rheumatoid

factor can be studied. The sensitivity of latex agglutination can be further enhanced by pre-heating the serum at 56° C. for fifteen minutes.¹² With this modification, an investigation of patients with classical rheumatoid arthritis (American Rheumatism Association criteria)¹³ reveals that nearly all have a positive latex test. Most of these individuals have high titers. In patients with early rheumatoid arthritis, titers tend to be lower and they frequently have negative reactions which slowly become positive after twelve to eighteen months. This group of patients often causes the greatest problem of differential diagnosis of joint pain.

A commercially available, rapid, slide agglutination technic has been recently described.¹⁴ This test has advantages of convenience and ready accessibility. We have compared the modified test tube latex test¹² with the slide agglutination method. The results are shown in table 1. It will be observed that high titered sera regularly cause a positive slide agglutination reaction. In sera with low titers of rheumatoid factor, it will be noted that the slide agglutination technic frequently fails to identify the rheumatoid factor. Since many of the sera with low titers occur in patients with false positive reactions, the slide latex agglutination test has some advantage over the tube dilution test.

The occurrence of false positive reactions in the latex agglutination test is of considerable interest. We have observed that patients with disseminated lupus erythematosus and periarteritis nodosa frequently contain the rheumatoid factor in their sera. Svartz and co-workers¹⁵ and Ziff and associates¹⁶ have shown that one may be able to differentiate the rheumatoid factor found in disseminated lupus erythematosus. By preparing a cold globulin precipitation in which the rheumatoid factor is concentrated in the precipitate,¹³ the sensitivity is enhanced in analysis of sera of patients with rheumatoid arthritis. If such a procedure is done in patients with disseminated lupus erythematosus, the agglutinating globulin is not precipitated but remains in solution. By such a differential, one can possibly distinguish between the two clinical entities.

A significant number of false positive latex titers are found in patients with hepatic disease, sarcoidosis, and syphilis. We have observed the titrable rheumatoid factor in patients with hepatitis, cirrhosis, acute cholangitis, peptic ulcer, and chronic pulmonary disease. One patient was of particular interest. She was admitted with a severe cholangitis. A latex agglutination titer of 1:10,000 was observed. As the hepatic dysfunction improved, the titer gradually decreased.

TABLE 1
COMPARISON OF THE TUBE LATEX AGGLUTINATION TEST
WITH A RAPID SLIDE AGGLUTINATION TECHNIC;
OBSERVE THE EXCELLENT AGREEMENT BEYOND A TUBE
DILUTION OF 1:640

Latex titers by tube test	No. Patients	No. patients with positive slide agglutination test	Per cent correlation
0	13	1	92
20	5	0	0
40	6	1	18
80	11	5	45
160	11	6	55
320	13	9	68
640	12	11	92
1,280	15	15	100
2,560	16	16	100
5,120 or greater	17	17	100
Total	119	81	

After five months, it fell to 1:160. Clinical investigation of such patients with elevated latex titers fails to reveal any history of significant joint disease or any clinical findings of rheumatoid arthritis. In some instances, however, a family history of rheumatoid arthritis has been obtained.

When one considers Ziff's and associates' finding of 15 per cent positive agglutination titers in asymptomatic relatives of rheumatoid patients as compared to 4 per cent positive among normal individuals, one might speculate that such asymptomatic individuals with the rheumatoid factor may have a genetically transmitted protein abnormality. One may also speculate that pathologic liver processes might accentuate the elaboration of such globulins.

An alternative explanation of false positive latex agglutination tests is suggested if one considers that a combination of the S_7 and S_{19} globulin is not a true antigen-antibody reaction but rather a different kind of a physicochemical union of S_7 globulin with an altered S_{19} macroglobulin. Such abnormal globulins might be synthesized in patients with hepatic disease in a comparable manner to the elaboration of abnormal beta globulins which cause thymol flocculation. Even in rheumatoid arthritis, this possibility must be considered an explanation for the behavior of sera in an S_7 gamma globulin system.

SUMMARY

Our experience with a modified tube latex agglutination test indicates that such a technic affords a practical and valuable method in the

evaluation of patients with joint symptoms. In well-established rheumatoid arthritis, this technic as well as the slide agglutination reaction yields a high per cent of positive results. In the first year of rheumatoid arthritis, the tube agglutination method often provides a useful clue to diagnosis, but often a negative result is obtained. Comparative tests with the latex slide agglutination method reveal that, in early disease, this technic is less sensitive than the tube agglutination method. However, this characteristic causes less frequent false positive reactions.

Positive latex agglutination tests are found in patients with disseminated lupus erythematosus, periarteritis nodosum, and hepatic dysfunction. The mechanism by which two coexisting plasma globulins combine affords speculation as to whether such a reaction represents an autoimmune process or whether it is a different type of protein-protein interaction.

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Olaf Jenson Hagen, M.D.

Surgeon, Educator and Humanitarian

J. ARTHUR MYERS, M.D.

EIGHTY-SEVEN years ago, on September 16, a baby boy was born in the pioneer lumber town of Menomonie, Wisconsin. Eight months later, his parents moved to the Red River Valley in Dakota Territory where the buildings consisted of those of old Fort Abercombie and a few scattered log and sod huts between what is now Breckenridge, Wahpeton, and the Canadian border.

In this area, with great expanses of waving grass and numerous roving American Indians, the first public schools were organized and conducted in the log houses of the community. When the baby born in Menomonie attained the age of 6 years, he was enrolled in the first of these schools as Olaf Jenson Hagen. He already possessed more information than most children of his age as he had an unusually inquiring and retentive mind. There was no opportunity for childhood or teen-age delinquency because all of his time was occupied with useful activities. When school closed in the afternoon, he hurried home and did such chores as feeding the domestic animals, carrying fuel to the container near the stove, helping his mother with work about the house, and studying his next day's lessons. Arising early in the morning, usually with the sun or before, chores were repeated and other work done about the premises until time to hurry off to school. During the school year, at recesses and the noon hours, the children played wholesome games. School closed early in the spring so that children could help with the activities of the farm, including plowing in preparation for planting. Olaf learned to plow at an early age. With a firm grip on the plow handles, he followed a team of horses 16 to 20 miles a day. Later, he worked at mowing, raking, and loading and then unloading hay and, finally, he

helped complete the harvest of small grains, corn, and vegetables. There was no transportation system to bring fresh fruits and vegetables daily from over the Rockies or from Florida and Texas. It was necessary to store and preserve foods for the long winter months, such as drying apples and sweet corn, burying vegetables so that they were protected against freezing, and storing others in a cool cellar.

Olaf helped butcher hogs and beef for winter use, make and stuff the sausage, render the lard, and administer a curing process to the hams for summer use. His family made candles from beef tallow.

In those days, shoes were such a luxury that schoolboy Hagen worked barefoot from early spring until late fall, often into November. In later years, he referred to these activities and conditions as the most effective courses for the development of patience and perseverance and an attitude of reverence for the job assigned, all of which he considers great virtues.

When he was 15 years old, Olaf entered the State Normal School at St. Cloud, Minnesota. From there, he went to Valparaiso University in Indiana. That institution then advertised a full school year of training with board, room, and supplies for \$125. In due time, he received the degree of Bachelor of Science from that university. He then took seminar courses at the University of Minnesota in American colonial and in medieval history, checking original source material, "revealing," he says, "some of the blackest chapters in the history of man."

He then became an instructor at Concordia College in Moorhead, Minnesota, where he served three years and for two summer sessions at the State Normal School in Mayville, North Dakota.

He never remained on a plateau very long as he

was always looking to and preparing himself for the one above. From the Moorhead post, he became superintendent of Richland County, North Dakota, rural and village schools, of which there were 178. He covered this territory, attending and supervising these various schools with horse and buggy and cutter.

He entered the medical school at the University of Minnesota and received the degree of Doctor of Medicine in 1906. This was at a time when there was only one medical school building on the University of Minnesota campus and two old remodeled houses, one for medicine and one for surgery. This was the year that Henry Morris began his lifelong career as medical photographer at the University of Minnesota and gradually reached the topmost rung of the ladder in that field.

Almost immediately after receiving the degree of Doctor of Medicine, Olaf went to the University of Berlin (1906-1907) for postgraduate work in medicine. Then he visited various other parts of Germany and Ireland, England, Scotland, Norway, Sweden, Denmark, and France.

After returning from Europe, he established an office where he conducted a general practice in the Moorhead area. There, among his numerous other services, he delivered more than 1,200 live babies—"A patriotic duty, for many of them were destined to fight and some of them to die in the defense of this great land."

In 1909, he engaged in graduate work at Harvard University.

While in general practice, Dr. Hagen and a small group of other physicians frequently discussed the formation of a clinic. This led to the founding of the Fargo Clinic in Fargo, North Dakota, of which, for the first six years, he was president. Later, for a period of twenty years, he was director of the clinic's radium department. It was in the Fargo Clinic and St. Luke's Hospital in Fargo that Dr. Hagen became a most successful and widely known surgeon and, for thirty years, served as a member of the surgical staff. For ten years, he was thyroid surgeon at the United States Veterans Hospital in Fargo. For five years, he was counselor for Minnesota for the American College of Surgeons, of which he himself had long been a fellow. He was elected to fellowship in the International College of Surgeons at Mexico City in 1941 and has been a regent of the United States chapter for more than a decade.

Dr. Hagen has long played an active role in medical organizations. He served for four years on the Council of the Minnesota State Medical Association and, at one time, was president of the Northern Minnesota Medical Association.

Apparently, from the day he entered that first log house temporarily used as a public school, he manifested great interest in his personal education and then in passing that knowledge which he had acquired on to others. Ever since those early school days, he has been a staunch promoter of education. He was a member of the Moorhead City Board of

Education for ten years and was its president for six years. For eight years, he was a member of the board of trustees at Concordia College in Moorhead, where he had held his first position as an instructor so long before. He was appointed to membership on the Minnesota State Teachers College board and was resident director of the Moorhead Teachers College for eight years.

The Minnesota State Legislature elected Dr. Hagen a member of the University of Minnesota Board of Regents in 1932, on which he served for six years. In 1936, he was elected president of the National Governing Boards of Regents, an organization representing 41 of the leading state universities and their allied institutions in America, including Puerto Rico. The same year, he was named a member of the American Council on Education in Washington, D. C.

Early in his medical career, Dr. Hagen manifested special interest in public health. His ability and knowledge were so recognized by Governor Eberhardt that he was appointed to membership on the State Board of Health in 1913 and served for four years. He was instrumental in arranging for a sanatorium for tuberculous patients to serve Clay and Becker counties and, with H. Longstreet Taylor, he selected the site of the Sand Beach Sanatorium at Lake Park, Minnesota. This institution was opened on December 6, 1916, and Dr. Hagen served faithfully as a member of the sanatorium commission for the next eight years, during seven of which he was president. Throughout the remaining years of that institution, he could always be counted upon to support and promote the various activities of its staff.

Dr. Hagen has been a most faithful worker in the field of tuberculosis and all of its numerous aspects. He possesses superior diagnostic acumen and has personally treated large numbers of tuberculous patients, both medically and surgically. His fine interest and service in prevention and eradication of tuberculosis soon became recognized everywhere. He participated actively in his local and state tuberculosis associations and has been a staunch supporter of the tuberculosis Christmas Seal and of all for which it has stood since it was introduced in Minnesota in 1909. He was a member of the executive committee of the Minnesota Public Health Association for ten years and served as president in 1937 and 1938. For more than a decade, he practically never missed a meeting of the executive committee, board of directors, and special committees. He continues as an emeritus member and is ever faithful in lending every possible support to this organization.

Dr. Hagen has an unusually fine command of English, which, combined with his large store of knowledge, has long made him popular with medical, nursing, and lay audiences. He has given freely of his time to programs to which he was invited at near and distant points.

He is a member of the Theta Chi academic fraternity and a charter member of the University of Minnesota Aeacian fraternity. He is a thirty-second

degree Mason and an honorary citizen of Father Flanagan's Boys' Town in Nebraska.

Concordia College, which he has served so well and so long, granted him the degree of Doctor of Laws in 1942. He is so recognized nationally and internationally that his biographical sketch appears in *Who's Who in America* and in *International Encyclopedia of World Biography*. In 1951, the Board of Regents of the University of Minnesota, on the recommendation of the University Senate and the Committee on Awards, granted Dr. Hagen the "Outstanding Achievement Award."

He has an ideal philosophy of life—no task too difficult, no day too long to help others solve their problems. The other person's problems are never too trivial to command his attention or too difficult to summon his best efforts. He has lived to promote and perpetuate all that is good. Since his own childhood, he has devoted much time and energy to each generation of children in his community to insure their good health and longevity, to provide them with every educational advantage, and to direct them into channels of useful and happy living.

He has been a source of inspiration to students of medicine and nursing and graduates of these professions of all ages in life's span. He has never manifested the slightest spirit of jealousy toward younger physicians but, on the contrary, he has encouraged and supported them. Those who have emulated his life, and there are many, owe him an everlasting debt of gratitude.

On June 24, 1911, Dr. Hagen married Moselle Weld, daughter of Dr. Frank A. Weld, president of Moorhead Normal School. They reared 4 children. After Mrs. Hagen died in 1930, Dr. Hagen kept the home intact and devoted every possible minute to providing a splendid home environment for the children.

Despite his outstanding achievements, Dr. Hagen exhibits admirable humility. In a letter of August 19, 1952, he says, "I can without reservation say that, though I have left no enduring footprints on the sands of time, I do shine by a certain reflected glory. I had two sons in World War II—and it is by their high performance that I take a just pride.

"The older of the sons was first an infantry soldier in the Pacific and, after the Guadalcanal victory, was awarded the Silver Star. Later, he became a B-25

bomber pilot and had completed 36 missions in Italy when the European war ended and he returned in good health.

"My younger son of 22 was not so fortunate. He, too, was in Italy, a rightwaist gunner on a liberator bomber stationed at the Foggia Air Field. On his fiftieth mission, he was critically wounded inside the bomber; the engines shot out of commission and headed for a crash over Linz, Austria, and so he died in the great tradition of his forebears on his mother's side of the family who had landed in the Massachusetts Bay Colony in the 1630's—their descendants destined, many of them, to fight and some to die in every war in American history.

"So all I can say now as to my sons is: 'Cheers for the living and tears for the dead.' Their glory is the reflected light that gives me some measure of temporal immortality."

In a letter dated March 2, 1958, he wrote, "I have been commuting between the hospital and my bed at home for the last three years anyway. During the flu epidemic in 1918, I did not sleep more than two or three hours a night for two months and did not suffer an attack, and yet now, lying in bed, I was attacked with the disease. Of course, I have had a coronary and later suffered a fracture of five ribs in my left chest in a fall from dizziness. I am staying with my daughter, Mrs. (Dr.) Marvin Geib, psychiatrist, here in Moorhead."

Although Dr. Hagen's residence has been mostly in Minnesota, so that official positions and appointments were made in this state, his long years of practice since the organization of the Fargo clinic were conducted just across the Red River in Fargo, North Dakota. Therefore, he has "belonged" almost equally to these states, each of which takes great pride in his long years of excellent service to patients and his outstanding contributions to medical knowledge.

Having known Dr. Hagen so long and having been associated with him so intimately in so many capacities, my respect and admiration for him and all for which he has labored have grown to great heights. On many occasions, I have eulogized him before medical and other audiences. This brief sketch of his life was written in order that present and future generations may have at least a glimpse of his eminent life as one of America's foremost physicians, educators, and humanitarians.

INDEX TO VOLUME 79

January 1959 through December 1959

SUBJECT INDEX

- AB hemolytic disease—a preliminary report, definition of, 254
- Abortion, spontaneous, emotional factors in, 199
- Abscess, recurrent retropharyngeal, 240
- Accidental poisoning in children, 442
- Acquired valvular heart disease in the private hospital, surgery of, 450
- Adenomas of the colon and rectum, 89
- Adrenal cortical compounds in hemorrhagic shock, use of, 460
- Aganglionic megacolon in the first year of life, 284
- Allergic
 reaction, acute, mechanism of the, 274
 rhinitis and allergic asthma, hyposensitization therapy in, 483
- Anastomosis, eversion, in the dog esophagus, 188
- Anemias, postgastrectomy, 552
- Angiography, 291
- Anxiety, separation—school phobia, 258
- Aphasia, the child with, 315
- Arthritis, rheumatoid, significance of the newer diagnostic tests for, 557
- Asthma
 allergic and nonallergic, therapy of, 20
 allergic, hyposensitization therapy in allergic rhinitis and, 483
- Atresia, intrahepatic biliary, 228
- Azygos vein, lobe occurring on the left, 308
- Bacterial endocarditis, subacute, diagnosis and treatment of, 512
- Barré-Lieou, syndrome of, osteoarthritis of the spine, and the shoulder-hand syndrome, 172
- Barron, Moses, M.D., 522
- Bilateral renal hypoplasia, 236
- Biliary atresia, intrahepatic, 228
- BIOGRAPHICAL SKETCHES
 Moses Barron, M.D., 522
 Winchell McK. Craig, M.D.—admiral of the ocean seas, 31
 Olaf Jenson Hagen, M.D., surgeon, educator, and humanitarian, 561
 Charles N. Hensel, M.D., 1882-1959, 388
 Arthur T. Laird, 168
- Archie McCannel, M.D., 1879-1959, 466
- James S. McCartney, Jr., M.D., 1893-1958, 86
- Erling S. Platou, a tribute to, 219
- A. A. Pleyte, M.D.—a personal appreciation, 324
- Sidney A. Slater, M.D.—educator, superior clinician, contributor to knowledge, and benefactor of humanity, 372
- Waltman Walters, M.D.—the enemy of time, 128
- Solon Marx White, M.D.—physician, educator, administrator, and beneficent friend of humanity, 214
- Biopsy, cutaneous, value in internal medicine, 177
- Bone, prevention and treatment of infections in, 2
- Book reviews
 Abnormal Labor (L. A. Calkins), E. W. Lowe, January 26A
 Aids to Neurology (E. A. Blake Pritchard), M. Fishbein, 524
 Allergic Encephalomyelitis (M. W. Kies and E. C. Alvord, Jr., editors), A. B. Baker, 570
 Anatomy for Surgeons (W. H. Hollinshead), J. H. Moe, 217
 Anesthesia for Infants and Children (R. M. Smith), I. Greenfield, December 22A
 Anomalies of Intestinal Rotation and Fixation (R. L. Estrada), L. J. Wells, May 26A
 Bases of Treatment, The (N. S. Stern), A. S. Anderson, April 28A
 Biological and Biochemical Bases of Behavior (H. F. Harlow and C. N. Woolsey, editors), J. S. Lundy, December 26A
 Breast Cancer (A. Segaloff, editor), J. H. Rosenow, 88
 Cardiac Arrest and Resuscitation (H. E. Stephenson, Jr.), J. H. Rosenow, May 23A
 Care of the Patient with a Stroke (G. W. Smith), C. H. Millikan, October 24A
 Cerebrospinal Fluid: Production, Circulation, and Absorption, The (G. E. W. Wolstenholme and C. M. O'Connor, editors), A. B. Baker, January 26A
 Chemical Quantitation of Epinephrine and Norepinephrine in Plasma (W. M. Manger, K. G. Wakim, and J. E. Bollman), J. C. Rosenberg, December 28A
 Child With a Handicap, The (E. E. Martmer, editor), H. M. Sterling, September 23A
 Clinical Enzymology (G. J. Martin, editor), P. D. Boyer, 32

- Color Atlas and Management of Vascular Disease (W. T. Foley and I. S. Wright), A. M. Ostfeld, 570
- De Circulatione Sanguinis (W. Harvey, translated by K. J. Franklin), A. S. Anderson, 526
- De Mortu Cordis (W. Harvey), C. A. McKinlay, 88
- Diagnostic Bacteriology (I. G. Schaub, M. K. Foley, E. G. Scott, and W. R. Bailey), R. F. Erickson, 130
- Endocrinology of Reproduction, The (J. T. Velardo, editor), T. H. Kirschbaum, 290
- Epilepsy (M. Sakel), F. Morrell, July 18A
- Epilepsy Handbook (F. A. Gibbs and F. W. Stamps), F. Morrell, 130
- Essentials of Gynecology (E. S. Taylor), W. B. Stromme, July 18A
- Fracture Surgery, a Textbook of Common Fractures (H. Milch and R. A. Milch), G. M. Hart, 290
- The Hand—Its Anatomy and Diseases (J. J. Byrne), J. H. Moe, July 18A
- Handbook of Respiration (P. L. Altman, et al.), M. B. Visscher, 130
- Hemophilic Arthropathies (H. H. Jordan), P. M. Arneson, 376
- Hermaphroditism, Genital Anomalies and Related Endocrine Disorders (H. W. Jones, Jr., and W. W. Scott), W. C. Alvarez, 326
- Host-Parasite Relationships in Living Cells (H. M. Felton, editor), J. D. Ross, May 23A
- House of Open Doors (H. Holand), J. A. Myers, 171
- Hypertension (J. H. Moyer, editor), G. deTakats, December 30A
- Intracranial Calcification (F. Mascherpa and V. Valentino), C. B. Holman, September 25A
- Introduction to Clinical Endocrinology (A. S. Mason), C. A. McKinlay, 32
- Lesions of the Cervical Intervertebral Disc (R. G. Spurling), J. H. Moe, January 26A
- Lesions of the Lower Bowel (R. J. Jackman), W. C. Bernstein, 290
- Life Insurance and Medicine (H. E. Ungerleider), E. Opstad, 290
- Lung, Clinical Physiology and Pulmonary Function Tests, The (J. H. Comroe, Jr., R. E. Forster II, A. B. DuBois, W. A. Briscoe, and E. Carlsen), E. B. Brown, Jr., September 23A
- Management of Childhood Asthma, The (F. Speer), E. L. Strem, April 28A
- Medical Radiographic Technic (W. L. Bloom, Jr., J. L. Hallenback, J. A. Morgan, and J. B. Thomas), I. M. Torp, December 28A
- Modern Chemotherapy of Tuberculosis (R. S. Mitchell and J. C. Bell), S. S. Cohen, August 24A
- Nutrition and Atherosclerosis (L. N. Katz, J. Stamler, and R. Pick), W. C. Alvarez, October 24A
- Office Orthopedics (L. Cozen), R. F. Erickson, December 26A
- Our Nuclear Adventure: Its Possibilities and Perils (D. G. Arnott), M. K. Loken, 326
- Pancreatitis (H. T. Blumenthal and J. G. Probst), C. A. McKinlay, 525
- Patient Care and Special Procedures in X-Ray Technology (C. H. Vennes), C. B. Holman, 524
- Pediatric Methods and Standards (F. H. Harvey, editor), J. A. Anderson, May 26A
- Peripheral Vascular Diseases (T. Winsor), H. O. McPheeters, October 30A
- Physiology of Cardiac Surgery (F. Gollan), V. Gott, 526
- Plasma Proteins, Clinical Significance, The (P. G. Weil), F. W. Hoffbauer, September 23A
- Practical Blood Transfusion (J. D. James), C. A. McKinlay, July 18A
- Practical Gynecology (W. J. Reich and M. J. Nechtow), E. W. Lowe, 88
- Practical Leads to Puzzling Diagnoses (W. C. Alvarez), S. Katzenelbogen, 376
- Practice of Nuclear Medicine, The (W. H. Bland, F. K. Bauer, and B. Cassen), M. K. Loken, 88
- Preventive Medicine (H. E. Hilleboe and G. W. Larimore), R. J. Vastine, Jr., 570
- Primer in Medical Technology, A (P. M. Kracmer), V. Rausch, September 25A
- Principles of Disability Evaluation (W. C. Smith), M. E. Knapp, 526
- Principles of Internal Medicine (T. R. Harrison, editor), C. A. McKinlay, 130
- Principles of Research in Biology and Medicine (Dwight J. Ingle), J. B. Carey, 32
- Regulation of Cell Metabolism (G. E. W. Wolstenholme and C. M. O'Connor, editors), G. A. Fleisher, 524
- Religious Doctrine and Medical Practice (R. T. Barton), A. S. Anderson, June 20A
- Schizophrenia—A Review of the Syndrome (L. Bellak, editor), D. W. Hastings, June 20A
- Surgical Pathology (L. V. Ackerman), J. I. Coc, 525
- System of Ophthalmic Illustration, A (P. Hansell), F. M. Walsh and L. D. Harris, 88
- Szondi Test in Diagnosis, Prognosis, and Treatment (L. Szondi, U. Moser, and M. W. Webb), C. D. Leake, 376
- Temporal Lobe Epilepsy (M. Baldwin and P. Bailey), F. Morrell, September 25A
- Textbook of Surgery (F. Moseley), R. N. Watman, December 24A
- Treatment in Internal Medicine (H. T. Hyman), W. C. Alvarez, May 26A
- Treatment of Diabetes Mellitus (E. P. Joslin, H. F. Root, P. White, and A. Marble), E. A. Hamz, 525
- Vascular Spiders and Related Lesions of the Skin (W. B. Bean), W. B. Bean, April 24A
- What We Do Know About Heart Attacks (J. W. Gofman, editor), C. A. McKinlay, September 23A
- X-Ray and Radium in Dermatology (B. A. Wansker), C. G. Vaughn, October 24A
- Burns, severe, clinical experience with Eagle's solution in the treatment of, 191
- Cancer congress, the seventh international (editorial), 129
- Cardiac disease, extracardiac factors in, 506
- septum and myocardium, rupture of, following myocardial infarction, 371
- CARDIOVASCULAR DISEASE, Series on
- Acquired valvular heart disease, surgery of, in the private hospital, 450
- Cardiac disease, extracardiac factors in, 509
- Chronic coronary disease, diagnosis and treatment of, 545
- Congenital heart disease
- some aspects of the surgery of, 382
- office diagnosis of, 378
- Introduction, 377
- Myocardial infarction, diagnosis and treatment of, 538
- Rheumatic fever, diagnosis and treatment of, 445
- Subacute bacterial endocarditis, diagnosis and treatment of, 512
- Cattle, the tuberculin test in, 212

- Cervical
erosion, postpartum, a procedure to prevent, 368
spine, osteoarthritis of, the syndrome of Barré-Liéon, and the shoulder-hand syndrome, 172
- Chest, fluoroscopy and radiology of the, 350
- Chickenpox, 17
- Child
health supervision, usefulness of tuberculin testing in, 150
retarded, what to tell parents of, 196
with aphasia, 315
- Childhood
dermatomyositis in—report of studies on 7 cases and a review of literature, 266
pulmonary congestion and edema as a complication of acute nephritis in, 246
- Children
accidental poisoning in, 442
management of primary tuberculosis in, 203
neglected hearing in, 357
- Chronic coronary disease, diagnosis and treatment of, 545
- Clinical
experience with Eagle's solution in the treatment of severe burns, 191
note: what to do?, 465
review: rupture of the cardiac septum and myocardium following myocardial infarction, 371
- Cold war, the, 147
- Colon and rectum, adenomas of the, 89
- COMMUNICABLE DISEASES, Series on
Chickenpox, 17
Diphtheria, 311
Influenza, 118
Pertussis, 49
Rubella, 193
Smallpox, the history and nature of, 498
Trichomonas vaginitis and trichomoniasis, 364
- Compounds, adrenal cortical, use in hemorrhagic shock, 460
- Congenital
heart disease, office diagnosis of, 378
heart disease, some aspects of the surgery of, 382
hip disease early in infancy, importance of suspecting and treating, 261
- Congestion and edema as a complication of acute nephritis in childhood, 246
- Coronary disease, chronic, diagnosis and treatment of, 545
- Cortical compound in hemorrhagic shock, use of adrenal, 460
- Craig, Winchell McK., M.D.—admiral of the ocean seas, 31
- Crush syndrome, the, 184
- Current literature, digests of, *see* Pain
- Cutaneous biopsy in internal medicine, value of, 177
- Depression
drug-induced, 118
mild, treatment with Deanol Para-Acetamidobenzoate, 25
- Dermatomyositis in childhood—report of studies on 7 cases, and a review of literature, 266
- Dietary management in lower gastrointestinal disease, 454
- Digests of current literature—*see* Pain
- Digitalis: its use and abuse—literature review, 8
- Diphtheria, 311
- Drug-induced depression, 121
- Eagle's solution in the treatment of severe burns, clinical experience with, 191
- Edema as a complication of acute nephritis in childhood, pulmonary congestion and, 246
- Electron microscope in medical research, 223
- Emotional factors in spontaneous abortion, 199
- Endocarditis, subacute bacterial, diagnosis and treatment of, 512
- Endometriosis, conservative management of, 179
- Erosion, postpartum cervical, a procedure to prevent, 368
- Erythema nodosum, 354
- Esophagitis, peptic, 14
- Esophagus, dog, eversion anastomosis in, 188
- Ethics of the physician, the, 295
- Fallot, tetralogy of, recent concepts of function and treatment, 287
- Female, 20-month-old, hyperchloremia and hypernatremia in, 264
- Femoral shaft fractures, 385
- Fetuses at 33 weeks' gestation in Rh-sensitized women who have had preceding stillbirths, prognosis of, 277
- Fibula, stabilization of lower tibial fractures by fixation of, 60
- Fluoroscopy and radiology of the chest, 350
- Fractures
lower tibial, stabilization by fixation of the fibula, 60
femoral shaft, 385
- FRACTURES, Series on
Bone, prevention and treatment of infections in, 2
Crush syndrome, the, 184
Femoral shaft fractures, 385
Introduction, 1
Orthopedic literature, review for 1957, 299
Orthopedic surgery, forty years of, 101
Peripheral nerve injuries, 348
Sequelae, treatment of fracture, 106
- Gastrointestinal disease, lower, dietary management in, 454
- General practice, management of chronic pain in, 33
- Gestation in Rh-sensitized women who have had preceding stillbirths, prognosis of fetuses at 33 weeks', 277
- Goiter, posterior mediastinal, 97
- Hagen, Olaf Jenson, M.D., surgeon, educator, and humanitarian, 561
- Handicapped, Minnesota plan for rehabilitation of, 489
- Hearing, neglected, in children, 357
- Heart block, complete, a bipolar myocardial electrode for, 506
- Heart disease
acquired valvular, surgery in the private hospital, 450
congenital, office diagnosis of, 378
congenital, some aspects of surgery, 382
remunerative, 62
- Hemolytic disease, AB, definition of—a preliminary report, 254
- Hemorrhagic shock, use of adrenal cortical compounds in, 460
- Hensel, Charles N., M.D., 1882-1959, 388
- Hip disease, congenital, importance of suspecting and treating early in infancy, 261
- Hospital
management of the tuberculous patient who leaves against medical advice, 142
private, surgery of acquired valvular heart disease in, 450
- Hyperchloremia and hypernatremia in a 20-month-old female, 264

- Hypoplasia, bilateral renal, 236
- Hyposensitization therapy in allergic rhinitis and allergic asthma, 483
- Immunity, tumor, and tissue transplantation, 240
- Infancy, importance of suspecting and treating congenital hip disease early in, 261
- Infarction, myocardial
diagnosis and treatment of, 538
rupture of the cardiac septum and myocardium following, 371
- Infections
in bone, prevention and treatment of, 2
urinary-tract, aspects of management of, 335
- Influenza, 118
- Injuries, peripheral nerve, 348
- Internal medicine, value of cutaneous biopsy in, 177
- Intrahepatic biliary atresia, 228
- Journey, medical, notes from a, 27, 82, 124, 321, 519
- Keratosis and precancerous lesions of the skin, 45
- Laird, Arthur T., 168
- Leg ulcers, observations on the therapy of, 435
- Lens, the: an oculist's preoccupation, 515
- Lesions of the skin, keratosis and precancerous, 45
- Literature, digests of current, *see* Pain
- McCannel, Archie, M.D., 1897-1959, 466
- McCartney, James S., Jr., M.D., 1893-1958, 86
- Mantoux test in search for TB cases, department urges, 434
- Megacolon, aganglionic, in the first year of life, 284
- Melanin and melanomas, of, 66
- Meprobamate-diuretic therapy in premenstrual tension, 318
- Microscope, the electron, in medical research, 223
- Minnesota
plan for rehabilitation of the handicapped, 489
tuberculin testing in, 153
- Myocardial
electrode, bipolar, for complete heart block, 506
infarction, diagnosis and treatment of, 538
infarction, rupture of the cardiac septum and myocardium following, 371
- Nephritis in childhood, acute, pulmonary congestion and edema as a complication of, 246
- Nephrosis, paradiene, 243
- Nerve injuries, peripheral, 348
- New Hampshire, tuberculosis in, 210
- Newborn and premature care, practical problems of, 113
- North Dakota State Medical Association
transactions of the, 391
Women's Auxiliary, proceedings, 468
- Orthopedic
literature for 1957, review of the, 299
surgery, forty years of, 101
- Osteitis deformans, 527
- Osteoarthritis of the cervical spine, the shoulder-hand syndrome, and syndrome of Barré-Liéou, 172
- PAIN, Section on
Book reviews
The Amphetamines: Their Actions and Uses (C. D. Leake), 175
Applied Medical Library Practice (T. E. Keys), 174
Basis of Behaviour (G. E. W. Wolstenholme and C. M. O'Connor, editors), 42
Clinical Radiology of Acute Abdominal Disorders (B. S. Epstein), 43
Fundamentals of General Anesthesia for Students and Practitioners of Dentistry (J. Adriani), 332
Hospital Planning for the Anesthesiologist (W. H. Dornette), 332
Modern Trends in Anesthesia (F. T. Evans and T. C. Gray), 332
Myasthenia Gravis (K. E. Osserman), 43
Pain (H. G. Wolff), 174
Radioactive Isotopes in Clinical Practice (E. H. Quimby), 174
The Recovery Room: A Symposium (J. Adriani), 42
Chronic pain in general practice, management of, 33
Digests of current literature
An aesthetic aspect of thymectomy for myasthenia gravis (J. Chang, J. H. Harland, and H. B. Graves), 43
Alteration of Pentothal-S35 distribution in mice by single doses of methyl-ethyl glutarimide (NP-13) (L. B. Achor, E. M. K. Geiling, and N. S. Domek), 44
Complications of thoracic surgery (H. D. Adams and D. P. Boyd), 175
Diagnosis and management of shock (E. S. Breed), 464
Fatal intracardiac embolization from indwelling intravenous polyethylene catheter (W. B. Ayers), 333
Halothane (Fluothan) in a country hospital (T. A. Brown and M. A. Woods), 333
Infusion treatment of shock. Alkali and acid in shock treatment (F. M. Allen), 175
New non-aqueous method of assay for the barbituric acids and some commercial products (L. G. Chatten), 43
Postanesthetic nausea, retching, and vomiting, evaluation of cyclizine (Marezine) suppositories for treatment (J. J. Bonica, W. Crepps, B. Monk, and B. Bennett), 464
Postoperative psychosis (R. P. Atkinson), 334
Practical clinical research sign of general anesthesia (K. W. Erwin and H. B. Crasileck), 333
Responsibilities and methods in maintenance of homeostasis in unconscious patient (R. Adams and A. E. Adams), 176
Treatment of acute cerebrovascular accidents (M. B. Bender), 175
Treatment of hyperemesis gravidarum with hypnotherapy (S. W. Giorlando and R. F. Mascoia), 464
Use of vasopressors in spinal anesthesia (H. F. Chase), 43
Hemorrhagic shock, use of adrenal cortical compounds in, 460
Shoulder-hand syndrome, syndrome of Barré-Liéou, and osteoarthritis of the cervical spine, 172
Soft-tissue sarcomas, a critical review of the management of, 327
Paradiene nephrosis, 243
Parents of a retarded child, what to tell, 196
Peptic esophagitis, 14
Peripheral nerve injuries, 348
Pertussis, 49
Phobia, separation anxiety—school, 258
Physician, the ethics of the, 295

- Poisoning in children, accidental, 442
 Posterior mediastinal goiter, 97
 Postgastrectomy anemias, 552
 Postpartum cervical erosion, a procedure to prevent, 368
 Precancerous lesions of the skin, keratoses and, 45
 Premature care, practical problems of newborn and, 113
 Premenstrual tension, meprobamate-diuretic therapy in, 318
 Psychiatric facilities and future possibilities, 548
 Psychosis, borderline organic, recognition and management of, 64
 Pterygium syndrome (status Bonnevie-Ullrich), 57
 Pulmonary
 congestion and edema as a complication of acute nephritis in childhood, 246
 tuberculosis, objectives in the treatment of, 205
 Radiography of the chest, fluoroscopy and, 350
 Reaction, acute allergic, mechanism of, 274
 Rectum, adenomas of the colon and, 89
 Rehabilitation of the handicapped, the Minnesota plan for, 489
 Remunerative heart disease, 62
 Renal hypoplasia, bilateral, 236
 Research, medical, the electron microscope in, 223
 Retarded child, what to tell parents of a, 196
 Retropharyngeal abscess, recurrent, 240
 Rh-sensitized women who have had preceding stillbirths, prognosis of fetuses at 33 weeks' gestation in, 277
 Rheumatic fever, diagnosis and treatment of, 445
 Rheumatoid arthritis, significance of the newer diagnostic tests for, 557
 Rhinitis and allergic asthma, hyposensitization therapy in allergic, 483
 Rubella, 193
 Rupture of the cardiac septum and myocardium following myocardial infarction, 371
 Sclerema neonatorum, 256
 Separation anxiety—school phobia, 258
 Sequelae, treatment of fracture, 106
 Shock, use of adrenal cortical compounds in hemorrhagic, 460
 Shoulder-hand syndrome, syndrome of Barré-Licou, and osteoarthritis of the cervical spine, 172
 Sinusitis, current treatment of, 535
 Skin, keratoses and precancerous lesions of, 45
 Slater, Sidney A., M.D.—educator, superior clinician, contributor to knowledge, and benefactor of humanity, 372
 Smallpox, the history and nature of, 498
 Soft-tissue sarcomas, a critical review of the management of, 327
 Spine, cervical, osteoarthritis of, shoulder-hand syndrome, and syndrome of Barré-Licou, 172
 Spontaneous abortion, emotional factors in, 199
 Stabilization of lower tibial fractures by fixation of the fibula, 60
 Stillbirths, prognosis of fetuses at 33 weeks' gestation in Rh-sensitized women who have had preceding, 277
 Subacute bacterial endocarditis, diagnosis and treatment of, 512
 Surgery
 of acquired valvular heart disease in the private hospital, 450
 of congenital heart disease, some aspects of the, 382
 orthopedic, forty years of, 101
 Tension, premenstrual, meprobamate-diuretic therapy in, 318
 Tests, newer diagnostic, for rheumatoid arthritis, significance of, 557
 Tetralogy of Fallot, recent concepts of function and treatment of, 287
 Tibial fractures, lower, stabilization by fixation of the fibula, 60
 Tissue transplantation, tumor immunity and, 240
 Trichomonas vaginitis and trichomoniasis, 364
 Transplantation, tumor immunity and tissue, 340
 Tuberculin test
 in cattle, 212
 in child health supervision, usefulness of, 150
 in Minnesota, 153
 thirty-five years of experience with, 135
 Tuberculosis
 control and treatment, the future of, 132
 eradication program, overcoming complacency in the, 208
 foreword on, 131
 in children, management of primary, 203
 in New Hampshire, 210
 Mantoux test in search for cases, 434
 pulmonary, objectives in the treatment of, 205
 Tuberculous patient who leaves the hospital against medical advice, management of the, 142
 Tumor immunity and tissue transplantation, 340
 Uleers, leg, observations on therapy, 435
 Urinary-tract infections, practical aspects of the management of, 335
 Valvular heart disease in the private hospital, surgery of, 450
 Walters, Waltman, M.D., the enemy of time, 128
 Women, Rh-sensitized who have had preceding stillbirths, prognosis of fetuses at 33 weeks' gestation in, 277
 Women's Auxiliary to the North Dakota State Medical Association, proceedings, 468

AUTHOR INDEX

- Anderson, John A., A tribute to Erling S. Platou, 219
 Anderson, R. J., Overcoming complacency in the tuberculosis eradication program, 208
 Atwater, Edward C. (co-author), Significance of the newer diagnostic tests for rheumatoid arthritis, 557
 Austrian, Sol, Diagnosis and treatment of rheumatic fever, 445
 Balotin, N. Malcolm, Digitalis: its use and abuse—literature review, 8
 Bell, E. T., Moses Barron, M.D., 522
 Bellomo, James
 (Co-author), Remunerative heart disease, 62
 (Co-author), Rupture of the cardiac septum and myocardium following myocardial infarction, 371

- Bernardez, Dominic (co-author), A bipolar myocardial electrode for complete heart block, 506
- Biering, Gunmar (co-author), Prognosis of fetuses at 33 weeks' gestation in Rh-sensitized women who have had preceding stillbirths, 277
- Bonica, John J., Management of chronic pain in general practice, 33
- Borg, Joseph F. (co-author), Diagnosis and treatment of subacute bacterial endocarditis, 512
- Brauer, Raymond O., Observations on the therapy of leg ulcer, 435
- Bravick, Donald, The crush syndrome, 184
- Briggs, John F.
The cold war, 147
Extracardiac factors in cardiac disease, 509
Introduction to series on cardiovascular disease, 377
(Co-author), Remunerative heart disease, 62
(Co-author), Rupture of the cardiac septum and myocardium following myocardial infarction, 371
- Buie, Louis A., The ethics of the physician, 295
- Burke, Edmund C. (co-author), Pulmonary congestion and edema as a complication of acute nephritis in childhood, 246
- Carlisle, John W. (co-author), Dermatomyositis in childhood—report of studies in 7 cases and a review of literature, 266
- Chisholm, Tague C. (co-author), Aganglionic megacolon in the first year of life, 284
- Christu, Chris N., Influenza, 118
- Clark, R. Lee, Jr. (co-author), A critical review of the management of soft-tissue sarcomas, 327
- Connolly, John E., The use of adrenal cortical compounds in hemorrhagic shock, 460
- Cook, Edward N., Practical aspects of the management of urinary tract infections, 335
- Cushing, Richard T., Importance of suspecting and treating congenital hip disease early in infancy, 261
- Dill, J. Lewis, Neglected hearing in children, 357
- DuShane, James W. (co-author), Recent concepts of function and treatment of tetralogy of Fallot, 287
- Elliott, James L. (co-author), Eversion anastomosis in the dog esophagus, 188
- Erlanson, A. Cornell (co-author), Recurrent retropharyngeal abscess, 240
- Etzwiler, Donnell D., Sclerema neonatorum, 256
- Finkel, K. C. (co-author), Paradione nephrosis, 243
- Freeman, John G., Psychiatric facilities and future possibilities, 548
- French, Lyle A., Peripheral nerve injuries, 348
- Frohmman, I. Phillips, Drug-induced depression, 121
- Fruchtman, Stanley A., Postgastrectomy anemias, 552
- Gayral, Louis (co-author), The shoulder-hand syndrome, syndrome of Barré-Liéou, and osteoarthritis of the cervical spine, 172
- Gehrke, August W. (co-author), The Minnesota plan for rehabilitation of the handicapped, 489
- Gelperin, Abraham, Management of the tuberculous patient who leaves the hospital against medical advice, 142
- Geschickter, Charles F., Therapy of allergic and non-allergic asthma, 20
- Charib, Reza (co-author), Pterygium syndrome (status Bonnevie-Ullrich), 57
- Chormley, Ralph K., Forty years of orthopedic surgery, 101
- Goltz, Robert W., Keratoses and precancerous lesions of the skin, 45
- Good, Robert A.
(Co-author), Dermatomyositis in childhood—report of studies on 7 cases and a review of literature, 266
(Co-author), The electron microscope in medical research, 223
- Greeley, Arthur V., Emotional factors in spontaneous abortion, 199
- Gunson, Harold H., Definition of AB hemolytic disease—a preliminary report
- Hempel, Dean J. (co-author), Recurrent retropharyngeal abscess, 240
- Hermann, Harold W. (co-author), Recurrent retropharyngeal abscess, 240
- Hilker, Robert, Osteitis deformans, 527
- Hirsch, Herbert M., Tumor immunity and tissue transplantation, 340
- Holand, Harold, A. A. Pleyte, M.D.—a personal appreciation, 324
- Hoover, Norman W. (co-author), Review of the orthopedic literature for 1957, 299
- Hunter, Samuel W.
(Co-author), A bipolar myocardial electrode for complete heart block, 506
Surgery of acquired valvular heart disease in the private hospital, 450
- Israels, S. (co-author), Paradione nephrosis, 243
- Jacobs, Sydney, Objectives in the treatment of pulmonary tuberculosis, 205
- Jacox, Ralph F. (co-author), Significance of the newer diagnostic tests for rheumatoid arthritis, 557
- Jaekel, J. L. (co-author), Bilateral renal hypoplasia, 236
- Janssen, Martin E., Diagnosis and treatment of chronic coronary disease, 545
- Kaiser, Irwin (co-author), Prognosis of fetuses at 33 weeks' gestation in Rh-sensitized women who have had preceding stillbirths, 277
- Keenan, William W. (co-author), The Minnesota plan for rehabilitation of the handicapped, 489
- Kendig, Edwin L., Jr., Management of primary tuberculosis in children, 203
- Kerr, Robert B., Tuberculosis in New Hampshire, 210
- Keys, Ancel, Notes from a medical journey, 27, 82, 124, 321, 519
- Kistner, Robert W., Conservative management of endometriosis, 179
- Knapp, Miland E., Treatment of fracture sequelae, 106
- Knudsen, Helen L. (co-author), The Minnesota plan for rehabilitation of the handicapped, 489
- Krivit, William (co-author), Prognosis of fetuses at 33 weeks gestation in Rh-sensitized women who have had preceding stillbirths, 277
- Krovetz, L. Jerome, Intrahepatic biliary atresia, 228
- Krusen, Frank H. (co-author), The Minnesota plan for rehabilitation of the handicapped, 489
- LeBien, Wayne E., Chickenpox, 17
- Lockey, Stephen D., Hyposensitization therapy in allergic rhinitis and allergic asthma, 483

- Logan, George B., Mechanism of the acute allergic reaction, 274
- Lund, C. M., The seventh international cancer congress (editorial), 129
- MacLean, Lloyd D., Some aspects of the surgery of congenital heart disease, 382
- McCannel, Malcolm A., The lens: an oculist's preoccupation, 515
- McKain, John M., Angiography, 291
- McParland, Felix (co-author), Aganglionic megacolon in the first year of life, 284
- Maeder, Edward C., Trichomonas vaginitis and trichomoniasis, 364
- Maloney, Walter H., Peptic esophagitis, 14
- Mark, Lloyd K., Fluoroscopy and radiography of the chest, 350
- Martin, Richard G. (co-author), A critical review of the management of soft-tissue sarcomas, 327
- Mazzitello, William F., Office diagnosis of congenital heart disease, 378
- Meller, Robert L., Treatment of mild depression with Deanol Para-Acetamidobenzoate, 25
- Meyers, M. Bert (co-author), Eversion anastomosis in the dog esophagus, 188
- Miles, James V., Pertussis, 49
- Moe, John H.
Introduction to a series of articles on fractures and related trauma, 1
Prevention and treatment of infections in bone, 2
- Montgomery, Hamilton, Value of cutaneous biopsy in internal medicine, 177
- Mosely, Jack M., Posterior mediastinal goiter, 97
- Myers, J. Arthur
Charles N. Hensel, M.D., 1882-1959, 388
Olaf Jensen Hagen, M.D., surgeon, educator, and humanitarian, 561
Refresher courses and special series (editorial), 389
Sidney A. Slater, M.D.—educator, superior clinician, contributor to knowledge, and benefactor to humanity, 214
Tuberculin testing in Minnesota, 153
- Neumann, Roland F., Femoral shaft fractures, 385
- Neuwirth, Eugene (co-author), The shoulder-hand syndrome, syndrome of Barré-Liéou, and osteoarthritis of the cervical spine, 172
- Nierling, R. D., Clinical note: what to do?, 465
- Noble, J. Larry (co-author), A bipolar myocardial electrode for complete heart block, 506
- O'Phelan, Harvey, Stabilization of lower tibial fractures by fixation of the fibula, 60
- Palmer, L. Secord, Recognition and management of borderline organic psychosis, 64
- Peikes, Irwil L., A procedure to prevent postpartum cervical erosion, 368
- Perkins, James E., Foreword on tuberculosis, 131
- Pfuetze, Karl H., The future of tuberculosis control and treatment, 132
- Platon, Erling S. (co-author), Diphtheria, 311
- Podolsky, Edward, Meproamate-diuretic therapy in premenstrual tension, 318
- Poindexter, M. H., Rubella, 193
- Pray, Laurence G. (co-author), Diphtheria, 311
- Richdorf, L. F., Hyperchloremia and hyponatremia in a 20-month-old female, 264
- Rosenfield, A. B., Accidental poisoning in children, 442
- Rosenthal, Robert, The history and nature of smallpox, 498
- Roth, Norman A. (co-author), A bipolar myocardial electrode for complete heart block, 506
- St. Geme, Joseph W., Jr., Of melanin and melanomas, 66
- Schenk, Worthington G., Jr. (co-author), Clinical experience with Eagle's solution in the treatment of severe burns, 191
- Simonton, Kinsey M., Current treatment of sinusitis, 535
- Slater, S. A., Thirty-five years of experience with the tuberculin test, 135
- Slimgaard, R. K. (co-author), Bilateral renal hypoplasia, 236
- Smith, Dnane, Dietary management in lower gastrointestinal disease, 454
- Spencer, Bernard J. (co-author), Aganglionic megacolon in the first year of life, 284
- Staub, Henry P., Practical problems of newborn and premature care, 113
- Stephens, James G. (co-author), Clinical experience with Eagle's solution in the treatment of severe burns, 191
- Stickler, Gunnar B. (co-author), Pterygium syndrome (status Bonnevie-Ullrich), 57
- Stitt, Pauline G., Usefulness of tuberculin testing in child health supervision, 150
- Sullivan, C. Roger (co-author), Review of the orthopedic literature for 1957, 299
- Swenson, Donald B. (co-author), Diagnosis and treatment of subacute bacterial endocarditis, 512
- Toro-Nazario, Rafael A. (co-author), Pulmonary congestion and edema as a complication of acute nephritis in childhood, 246
- Tregilgas, Richard B., Diagnosis and treatment of myocardial infarction, 538
- Tudor, Richard B., What to tell parents of a retarded child, 196
- Tuohy, Edward L., Arthur T. Laird, M.D., 168
- Vernier, Robert L. (co-author), The electron microscope in medical research, 223
- Visscher, Maurice B., Hybrid vigor in medical science (editorial), 390
- Wallinga, Jack V., Separation anxiety—school phobia, 258
- Walls, William L., Lobe of the azygos vein occurring on the left, 308
- Wasemiller, E. R., Adenomas of the colon and rectum, 89
- Weidman, William H. (co-author), Recent concepts of function and treatment of tetralogy of Fallot, 287
- White, E. C. (co-author), A critical review of the management of soft-tissue sarcomas, 327
- Williams, J. E., The tuberculin test in cattle, 212
- Willig, Selwyn, Erythema nodosa, 354
- Wood, Nancy E., The child with aphasia, 315
- Worthen, Howard G. (co-author), The electron microscope in medical research, 223
- Wright, Willard A., Archie McCannel, M.D., 1879-1959, 466

Book Reviews

Preventive Medicine

HERMAN E. HILLEBOE, M.D., and GRANVILLE W. LARIMORE, M.D., *Editors*, 1959. Philadelphia: W. B. Saunders Co. 731 pages. Illustrated. \$12.00.

This is not a reference text for those who already have experience in the field of preventive medicine but rather a passing on of this experience to those of us who use some of its ramifications daily and many of its ramifications occasionally. For the medical student, general practitioner, and many specialists, this will be a worthwhile addition to the library. The writings of 31 contributors have been grouped in an interesting format by the editors.

The book is divided into 3 parts, namely, 1) Prevention of Occurrence; 2) Prevention of Progression; and 3) Supporting Services for Preventive Medicine. This allows for simplicity in the presentation of the material.

The first 2 parts satisfy the definition of preventive medicine as presented by the editors, which is: the principals of prevention in the occurrence and progression of disease. Part 1 discusses, in an interesting manner, the means of preventing the occurrence of disease from all the various causes. Part 2 discusses periodic health appraisals and screening methods for the detection of cancer, tuberculosis, heart disease, diabetes, and hearing and visual defects. There is also a discussion of follow-up of these examinations, and 3 chapters are devoted to rehabilitation, alcoholism, and narcotic addiction, respectively. Part 3 presents the services available for preventive medicine education and for aids in its practice.

All in all, the text is easily read and each topic presented in a sensible, nondogmatic manner so that the reader may make his own decisions from the unbiased discussion. Those who have contributed to this volume have made every effort to stimulate the interest of the reader in the field of preventive medicine and its application to every day medical practice.

RUSSELL J. VASTINE, JR., M.D.
Niles, Michigan

Color Atlas and Management of Vascular Disease

WILLIAM T. FOLEY, M.D., and IRVING S. WRIGHT, M.D., 1959. New York: Appleton-Century-Crofts, Inc. 170 pages. Illustrated. \$18.00.

It is the stated aim of the authors of this book to present in color those tissue changes which must be understood for accurate diagnosis of vascular disease. There are 7 chapters entitled, "Arterial Diseases," "Venous Diseases," "Lymphedema," "Vasospasm and Diseases in Which It Plays a Major Role," "Aneurysm," "Diseases of the Small Vessels," and "Blood Vessel Tumors." Ninety-four cases observed by the authors and their associates and documented by colored photographs illustrate the principles of diagnosis and management described in these chapters. The book is written with extraordinary simplicity and lucidity and is entirely clinical and pragmatic in approach. Written essentially for the general practitioner and internist, it should appeal to the surgeon as well.

House staff and medical students doubtless will find it useful.

There are certain sharp limitations of the volume that appear to have been deliberately set up by the authors. This is not the place to go to read exhaustively about the pathophysiology or pathology of vascular disease, nor is it a review of all pertinent literature of the past three decades. That is not what the authors intended. The amount of physiology and pathology included is just sufficient to enable the reader to understand the principles of management. The number of references included is just large enough to direct the more interested reader to some source material. Controversial aspects of the management of vascular disease are mentioned but are not dilated upon, and the authors usually simply state what treatment they advocated in each case and the reasons for their opinions. What the volume tries to do, and indeed what it has succeeded in doing, is to present simply and vividly the clinical experience of the authors in a form suitable for the busy practitioner.

ADRIAN M. OSTFELD, M.D.,
Chicago

Allergic Encephalomyelitis

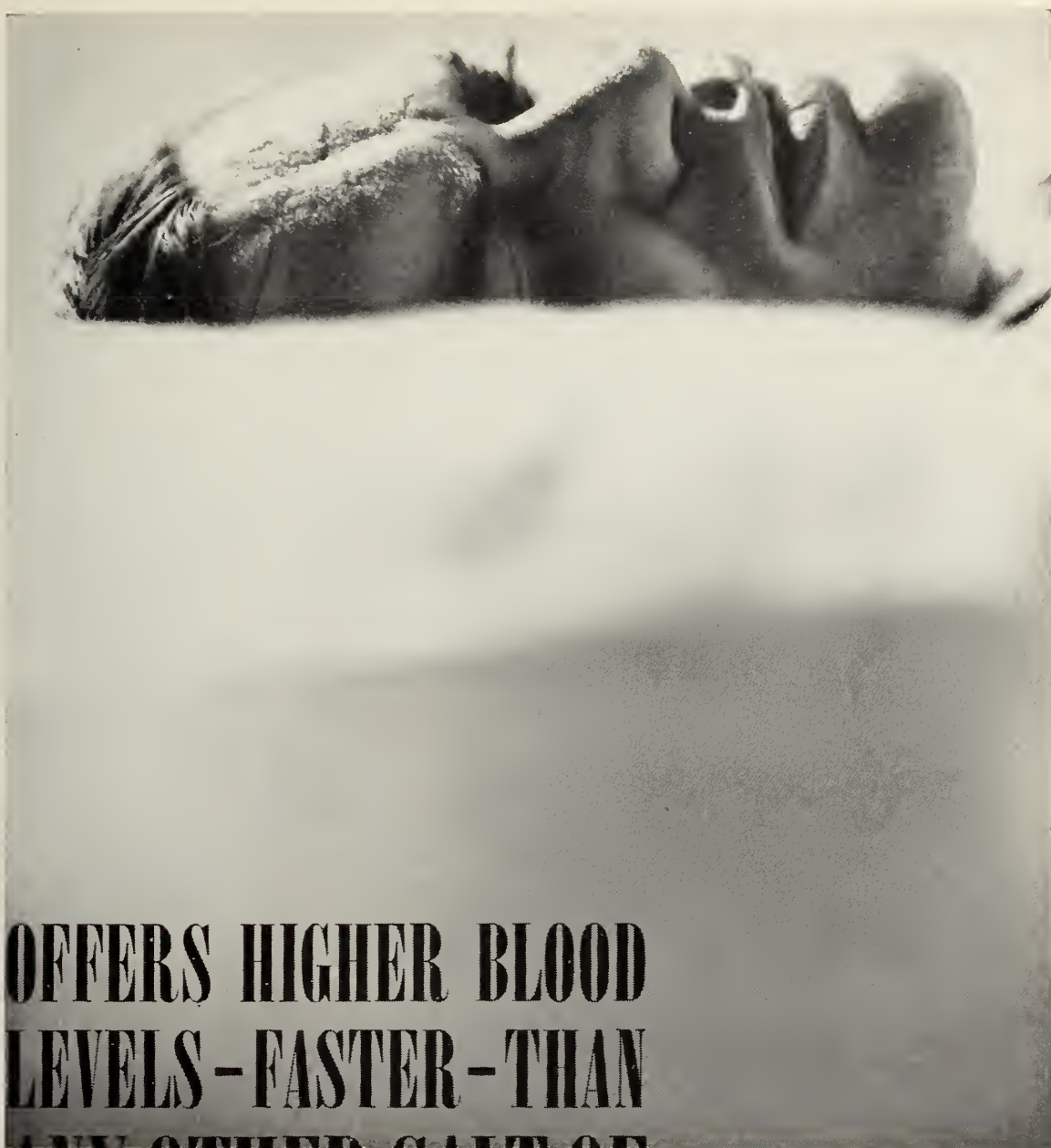
MARIAN W. KIES, PH.D., and ELLSWORTH C. ALVORD, JR., M.D., *Editors*, 1959. Springfield, Ill.: Charles C Thomas. 576 pages. Illustrated. \$13.50.

The allergic responses of the central nervous system have occupied the attention of scientists and clinicians for many years with the result that a tremendous and diffuse literature has accumulated on this subject. Because of the many conflicting observations and opinions, particularly as regards the importance of allergic encephalomyelitis to diseases of man, this comprehensive volume is most welcome and should prove very useful. This book contains a digest of a symposium held on this subject in which the world's foremost scientists were brought together to discuss and critically analyze the present status of this field. The material is divided into 3 sections. Section 1 deals primarily with the clinicopathologic correlations of this disease and will prove most interesting to the clinician. An attempt is made to describe the appearance of this allergic process in animals and to correlate these changes with certain diseases of man, such as multiple sclerosis and the postvaccinal encephalomyelitides. The last two sections deal primarily with the experimental aspects of the subject. Section 2 considers the various observations on the possible nature of the encephalitogenic agent which produces the nervous system damage, and section 3 covers the immunologic aspects of this allergic reaction.

Since, at the present time, this subject is of more theoretic than clinical interest, this volume will prove most useful to teachers and investigators interested in the nervous system. It is an excellent digest of a very complicated field and should comprise a useful addition to the literature.

A. B. BAKER, M.D.
Minneapolis

(Continued on page 22A)



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BOOK REVIEWS

(Continued from page 570)

Anesthesia for Infants and Children

ROBERT M. SMITH, M.D., 1959. St. Louis: C. V. Mosby Co. 418 pages. Illustrated. \$12.00.

It is rare indeed to encounter a medical textbook that is enjoyable to read and is also informative and educational. For the practicing anesthesiologist, such a text can be found in this volume.

As anesthesiologist to the Children's Hospital Medical Center of the Harvard Medical School of Boston, Dr. Smith has had an excellent opportunity to try out many of the newer anesthetic techniques and drugs in coming to a conclusion as to their usefulness in the anesthetic care of the infant and child. The opportunity of seeing how the various anesthetic methods function under a variety of conditions was available because of the large resident training program under Dr. Smith's guidance.

The text assumes a logical sequence as it starts out with "Basic Requirements in Pediatric Anesthesia" and develops the subject from the simple aspects to those presenting more difficult problems.

Chapter 3, "Respiratory Physiology in Infants and Children," was written by Dr. Charles D. Cook of the Harvard Medical School. Here one can find the latest information with respect to respiratory physiology in the infant and child. This chapter is well done, and a most difficult subject is presented in a very understandable manner. This chapter blends very well with the remainder of the text.

The philosophy of Dr. Smith and that which permeates throughout the book can best be expressed by quoting from his text the paragraph on page 19 entitled "Safety."

"To say that safety is the first principle in actual patient management seems obvious and trite, but to omit it would be inexcusable. The subject deserves special consideration in pediatric anesthesia, first, because mortality at present is unreasonably high, and, second, because there is often considerable difficulty in deciding which approach is safest. Safety in anesthesia is a relative thing, dependent upon many factors. If any generalization is made, it immediately must be modified to suit individual cases. Reference to maximum safety here will mean that which in the hands of the average anesthetist will entail least danger in a large number of cases. Opinions are based on experience of several years in which large numbers of children have been anesthetized by a rapidly changing group of residents.

"There are now many anesthetists who have developed special skills and techniques with children. Spinal and local anesthetics, relaxants, and intravenous agents which might be inadvisable in the hands of the inexperienced may be used with special advantages by those who have had adequate experience. Consequently there are few if any techniques that can be completely condemned.

"At the present stage of development, however, the criterion for most should not be 'What can I get away with?' or 'What will look most impressive?' but 'what will get me into least real trouble in 100 cases?'"

The text is well organized, and the photographs are clear and demonstrate many of the features described in the manuscript. The references and bibliography at the end of each chapter are ample and complete.

This book can be recommended to all those who practice anesthesia. It should also be included in the library of every pediatrician and surgeon.

IRVING GREENFIELD, M.D.
Minneapolis

(Continued on page 24A)

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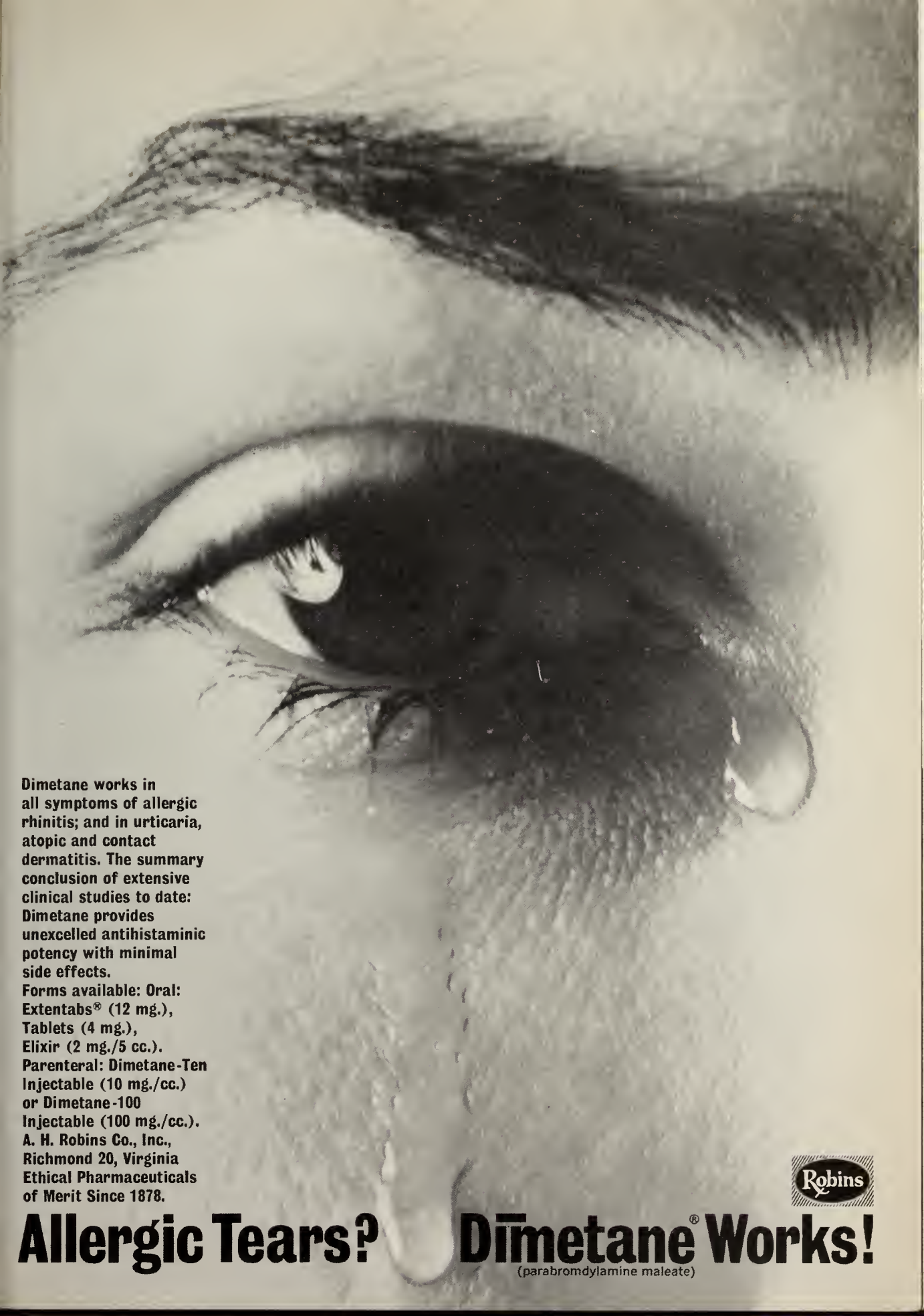
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BOOK REVIEWS

(Continued from page 22A)

Textbook of Surgery

FRED MOSELEY, M.D., *Editor*, 1959. St. Louis: C. V. Mosby Co. 1,336 pages. Illustrated. \$17.00

This is the third edition of a textbook which has become a standard work on the North American continent.

The book has been written by a distinguished group of 40 Canadian authors. The general quality of the writing is excellent and clear, and the volume is well and profusely illustrated. Many of the illustrations are by F. Netter, whose drawings are well known. Some are a bit "candy cane" in appearance, but all are of excellent teaching value. As in any volume by multiple authors, the sections vary in content, organization, and quality.

The text opens with a short, neat history of the evolution of modern surgery, remarkable for the information contained in just 15 pages. The basic sections on inflammation and repair, bacteriology and surgical infections, shock and blood transfusions, and injuries due to physical agents are of good quality and contain excellent teaching material.

The chapter on pre- and postoperative care is quite sound, but one might wish for a bit more detail concerning the metabolic responses to stress and the phenomena of convalescence.

The section on fluid and electrolyte balance is neatly and well presented and illustrated, and the chapter on radioisotopes in surgery is excellently presented, though a short bibliography might be a useful adjunct.

The section on endocrine disorders is, in some instances, rather sketchy. Those paragraphs explaining the physiologic derivation of diagnostic procedures and the

problems of therapy perhaps sacrifice detail for brevity, in some instances to the detriment of the description.

Diseases of the breast are excellently and lucidly presented, as is the section on diseases of the thorax.

The text devoted to the digestive tract again, at times, seems to sacrifice needful explanatory detail to brevity. This is particularly so in the sections on management of the general metabolic consequences and complications of the various lesions.

The specialty sections on plastic, pediatric, genitourinary, and gynecologic surgery are very well presented. That on peripheral vascular disease is excellent, though one may perhaps question whether an embolus in a major artery, diagnosed early, should first be treated nonsurgically and attacked only if nonoperative treatment fails.

The last quarter of the book is devoted to very satisfactory sections on amputations, fractures, and orthopedic topics.

ROBERT N. WATMAN, M.D.
Columbus, Ohio

Biological and Biochemical Bases of Behavior

HARRY F. HARLOW and CLINTON N. WOOLSEY, Editors, 1958. Madison: University of Wisconsin Press. 476 pages. \$8.00.

This volume from the University of Wisconsin is the collective work of 20 investigators at Yale University; the Walter Reed Army Medical Center; McGill University; National Institutes of Health; Ohio State University; the Institute of Living in Hartford, Connecticut; Johns Hopkins University; California Institute of Technology; the Montreal Neurological Institute; and the universities of California, Chicago, Wisconsin, and Michigan.

(Continued on page 26A)

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1. Alvarez, W. C.: *Geriatrics* 13:647, 1958.

2. Gale, E. T., and Thewlis, M. W.: *Geriatrics* 8:80, 1953.

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BOOK REVIEWS

(Continued from page 24A)

The preface states that "One of the most important developments in the biological sciences during the last fifty years has been the growth of interdisciplinary research. The correlation of physiologic and anatomic data is an excellent example of this trend. A somewhat more recent but equally impressive movement has been the correlation of behavior with data obtained from other biological sciences—anatomy, embryology, physiology, pharmacology, and biochemistry. The information that has come from these interdisciplinary researches has not only been of great importance in its own right but has stimulated research within the individual disciplines.

"In order to summarize and correlate ongoing programs within the areas of anatomy, physiology, biochemistry, and behavior involving researches in a host of laboratories, the Symposium on Interdisciplinary Research was arranged. The participants and the discussants are eminent authorities within their own disciplines, and in addition they are men recognized for their many contributions in interareal researches."

As indicated in the foregoing, this unusual book is the product of a symposium conducted at the University of Wisconsin. The contributions are of a very high order. One of the most fascinating is the chapter by Herbert Jasper of the Montreal Neurological Institute on "Reticular-Cortical Systems and Theories of the Integrative Action of the Brain." Another stimulating contribution is that by H. W. Magoun of the University of California on "Non-Specific Brain Mechanisms."

Complete understanding of all the complex material in this book calls for intelligence and learning of uncommon dimensions, but, very probably, any scientist would be stimulated simply by glancing at the text. The book

is indexed, and each contribution is documented by an excellent bibliography.

JOHN S. LUNDY, M.D.
Rochester, Minnesota

Office Orthopedics

LEWIS COZEN, M.D., 1959. Philadelphia: Lea & Febiger. 430 pages. Illustrated. \$9.50.

This is the third edition of an excellent and most practical book. It is not, of course, a complete text on orthopedics but rather a very useful guide for general practitioners particularly. It will be useful to any physician or hospital resident who is called upon to treat athletic and industrial injuries.

As the title suggests, the book deals primarily with those cases seen in the office, clinic, or outpatient department in the general hospital. The simple therapeutic methods here outlined are especially aimed at ambulatory orthopedic cases.

In this latest edition more space is devoted to the use of injectable steroids than in the previous editions. More than 100 pages in this edition are devoted to orthopedic conditions in children; there is a wealth of useful information in Section III. It is very well done and is as good a review of congenital orthopedic defects as one may find anywhere. There is also a useful chapter on how to examine orthopedic cases for the court.

The book is well printed on good stock and is easy to read. The contents in the front of the book and the index in the back appear to be satisfactory.

This book is recommended to all physicians who are called upon to diagnose or to treat the ambulatory orthopedic patient.

REUBEN F. ERICKSON
Minneapolis

(Continued on page 28A)



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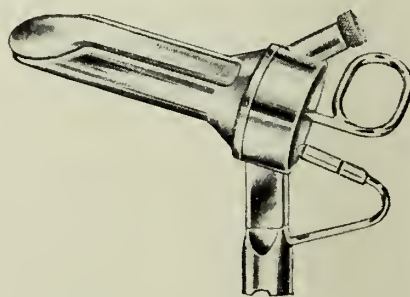


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BOOK REVIEWS

(Continued from page 26)A

Medical Radiographic Technic

WILLIAM L. BLOOM, JR., JOHN L. HALLENBACK, R.T.,
JAMES A. MORGAN, R.T., and JOHN B. THOMAS, R.T.,
1959. Springfield, Ill.: Charles C Thomas. 386 pages.
Illustrated. \$11.00

The second edition of this book is a revision of the original prepared under the editorial supervision of the late Glenn W. Files. It is written with a keen insight for students and yet is not too fundamental for use by the experienced technician. The outstanding teaching ability of the authors, such as John B. Thomas, is very evident throughout the entire book.

The authors have covered every phase of radiographic technic from physics to special studies. The simple but detailed explanation of physics is excellent for teaching or for a quick review. A thorough and practical explanation of modern diagnostic x-ray equipment is included, and the application of the various types of generators is discussed. Again, the illustrations make these explanations easily understood.

The book details x-ray protection, which is a subject of prime importance to all operators of radiographic equipment. The use of cones, both old and new, is explained. The section on radiographic anatomy is covered thoroughly, with clearly labeled diagrams for study by the student or for quick reference for the more experienced technician.

Every phase of technic is covered in great detail as only experienced instructors are capable of doing. Fixed voltage technics have been added for each position, and variable voltage technics have been revised consistent with modern procedures and equipment capacities. The technician is given a very clear picture of the part to be radiographed, a description of x-ray tube and film alignment, and illustrations of the resulting radiograph.

This edition presents an excellent explanation of the functions and uses of body-section radiography, which is being employed more and more today in all departments.

One of the outstanding features of this edition is the chapter on special procedures. This chapter provides information on a number of special studies which are being done and the contrast media most commonly employed and is illustrated with radiographs so a greater understanding of the end result can be realized.

This is an excellent, well written, and exceptionally well illustrated book on radiographic technic. It is highly recommended for all diagnostic x-ray departments.

INEZ M. TORP, R.T.
Minneapolis

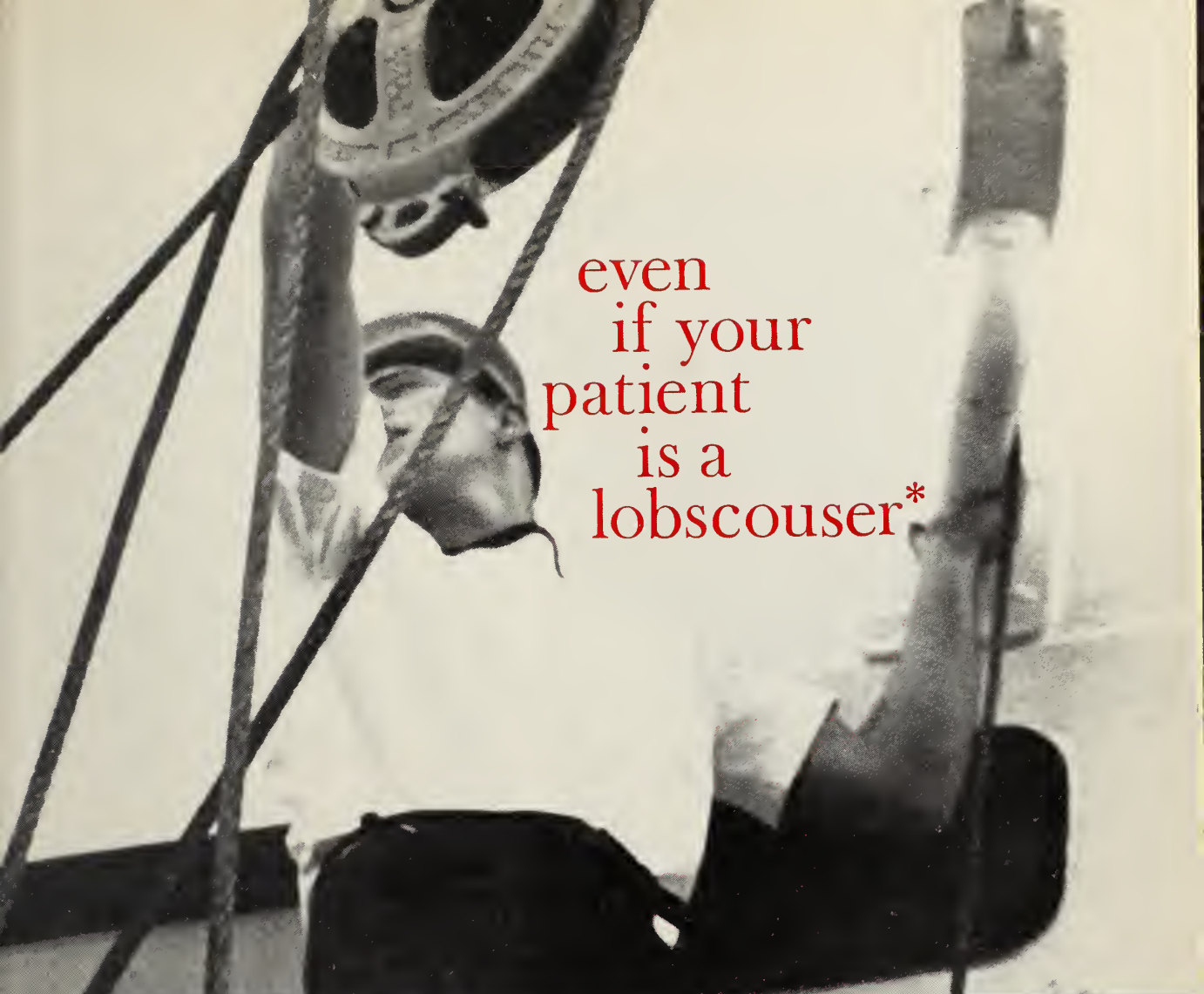
Chemical Quantitation of Epinephrine and Norepinephrine in Plasma

WILLIAM MUIR MANGER, M.D., PH.D., KHALIL G. WAKIM, M.D., PH.D., and JESSE E. BOLLMAN, M.D., 1959. Springfield, Ill.: Charles C Thomas. 354 pages. \$11.50.

A great deal of information is available concerning the biochemical, physiologic, pharmacologic, and therapeutic properties of epinephrine and norepinephrine. As copious as the literature is on this subject, there are still problems involving these substances which remain unsolved.

In 1952, Weil-Malherbe and Bone published a method for the determination of "adrenaline-like substances" in blood. They subsequently modified it (as did many others, including the authors of this monograph) so that

(Continued on page 30A)



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254A59

BOOK REVIEWS

(Continued from page 28A)

the plasma concentration of epinephrine and norepinephrine could be estimated. This valuable tool was previously not available to workers interested in the catechol amines. With it, investigators were able to probe more deeply into the actions and effects of the vasopressor substances in a variety of situations. One of the earliest investigators to utilize the newly developed fluorimetric determination was a group at the Mayo Clinic. This monograph represents the products of their labors. The contents of the book are indicated by its subtitle: *Their (epinephrine and norepinephrine) Plasma Concentration in Hypertension, Shock and Mental Disease*.

The first chapter is concerned with methodology of the Weil-Malherbe and Bone ethylenediamine (EDA) condensation technic of estimating epinephrine and norepinephrine. It is an excellent review of the present knowledge of the advantages and disadvantages of the determination. The chapter on hypertension may be too heterogenous, but the section on pheochromocytomas is most enlightening. The remaining chapters on the findings of plasma catechol amine levels in shock and mental disease and the chapter entitled "Some Metabolic Studies on Epinephrine and Norepinephrine" are all too brief and leave the reader disappointed, much like reading a "mystery" wherein the mystery remains unsolved. However, the authors of this monograph have clearly made contributions to the ultimate solution of the many problems which surround the vasopressor amines. This book should be of great interest to investigators working with these substances and those concerned with hypertension and shock.

The book's outstanding feature is that it represents some of the earliest work done utilizing the recently de-

veloped fluorimetric determination for epinephrine and norepinephrine. However, it is disconnected and incomplete because all of the facts are not yet available.

J. C. ROSENBERG, M.D.
Minneapolis

Hypertension

JOHN H. MOYER, M.D., Editor, 1959. Philadelphia: W. B. Saunders Co. 790 pages. Illustrated. \$14.00.

This is a report of the first Hahnemann symposium on hypertensive disease, with 91 contributors, whose papers, discussions, and repartee are presented in 790 pages. There is a great deal of valuable information, but it is hidden among textbook descriptions of well known data and philosophic dissertations of the nature of after-dinner talks. The participants vary from physiologists and biochemists to internists who have done outstanding work in the field and even surgeons, since all agreed that surgical procedures are coming back into their own, although in a limited extent and with restricted indications.

For those who have special interest in hypertension, this book contains a spectacular amount of information and stimulation. For the medical practitioner who would like to treat his next patient with the most up-to-date and widely accepted methods, the text is confusing, nay exasperating. John Moyer, the editor and organizer of this symposium, has made a heroic effort to maintain the spirit of a seminar and still disseminate therapeutic conclusions to the practicing physician. If symposia of this sort are to have an effect on the general practice of medicine, they must dismantle the academic robe and put on working clothes. The gulf is not insurmountable.

GEZA DETAKATS, M.D.
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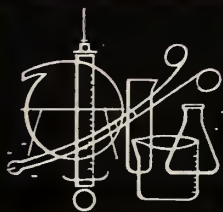
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News Briefs . . .



Dr. Jay Arthur Myers, left, and Dr. Robert B. Howard, right

DR. J. ARTHUR MYERS, professor emeritus of public health and internal medicine, University of Minnesota, received the university's Outstanding Achievement Award September 28 in ceremonies at the medical school. The award, highest honor the board of regents can confer, is given to former students who "attain highest distinction in their chosen fields or in the area of public service." Dean Robert B. Howard presented the award. Dr. Myers, a member of the medical school class of 1920, is chairman of THE JOURNAL-LANCET board of editors, author of 17 books and more than 700 scientific papers. Even though retired from teaching, he continues his lifelong interest in the control of tuberculosis and is compiling an extensive research report on tubercular patients seen during his lengthy practice.

DR. OWEN H. WANGENSTEEN, Minneapolis, became President of the American College of Surgeons on October 2, during the closing session of the College's 45th annual Clinical Congress, the largest surgical meeting in the world.

A distinguished surgeon and teacher, Dr. Wangensteen is Professor and Chairman of the Department of Surgery of the University of Minnesota School of Medicine, and Chief of the University of Minnesota Hospitals. He has been a Governor and Regent of the American College of Surgeons and served as First Vice-President in 1956 and 1957. Dr. Wangensteen became a Fellow of the College in 1929. He holds an honorary LL.D. degree from the University of Buffalo (1946), and an honorary D.Sc. degree from the University of Chicago (1956).

Dr. Wangensteen is a member of many scientific and surgical organizations, including the International Society of Surgery, American and Western Surgical associations, Halsted Surgical Society, American Association for Thoracic Surgery, American Board of Thoracic Surgery, Society of Experimental Biology and Medicine, American Association for the Advancement of Science, Minnesota Pathological Society (President, 1939), Minnesota Academy of Medicine (President, 1952), and the Society of Experimental Pathology. He served as a Director of the American Cancer Society, and was a member of the U.S. Public Health Service Heart Council from 1953 to 1957.

He is the co-editor of *Surgery*, author of *The Therapeutic Problem in Bowel Obstruction*, and contributor to numerous medical journals.

The Samuel D. Gross prize of the Philadelphia Academy of Surgery was awarded to Dr. Wangensteen in 1935 for development of suction siphonage treatment of

(Continued on page 34A)

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NEWS BRIEFS

(Continued from page 32A)

acute intestinal obstruction; the widely-used device he originated is known among physicians everywhere as the "Wangensteen Tube." In 1941, the city of Philadelphia presented the John Scott Award and Medal to him for this contribution to medical science. In 1949, he received the Alvarenza Prize of the Philadelphia College of Surgeons for work in ulcer problems and the Minnesota Division American Cancer Society Award.

Dr. Wangenstein was born in Lake Park, Minnesota, on September 21, 1898. He attended the University of Minnesota, receiving his M.D. in 1922 and a Ph.D. in surgery in 1925.

He received postgraduate training in medicine at the University of Minnesota; in surgery, at the Mayo Clinic, the University of Minnesota, and the University Hospital. He also was assistant in Professor F. de Quervain's Surgical Clinic, and the Physiological Institute of Professor Leon Asher, in Berne, Switzerland, from 1927 to 1928.

Dr. Wangenstein's interests are in experimental and clinical surgery, particularly problems of the alimentary tract, including intestinal obstruction, etiology of appendicitis, peptic ulcer problems including esophagitis, and cancer of the alimentary tract.

North Dakota

DR. R. F. NUESSE of Bismarck has been elected president of the North Dakota chapter of the American College of Surgeons. He succeeds Dr. E. J. Larson of Jamestown. Other new officers are Dr. G. W. Toomey, Devils Lake, vice-president, and Dr. Robert Schoregge, Bismarck, secretary-treasurer.

JOHN F. LOOP has been elected president of the newly incorporated Bismarck Psychiatric Center. Henry F. Flohr was elected vice-president, and Alec H. Sym, secretary-treasurer. The other incorporators include M. H. Herrick, Harlan D. Hobbs, Hugh E. Palmer, Richard P. Rausch, Elmer J. Roswick, T. W. Settle, and Charles Swenson.

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Dr. O. W. JOHNSON of Rugby, former civilian aid to Army Secretary Wilber M. Brucker, has received a certificate of appreciation from Brucker.

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Dr. R. B. TUDOR of the Quain and Ramstad Clinic, Bismarck, was program chairman of the annual Fall Clinical Conference sponsored by the clinic. Among guest speakers were Dr. Alexander Marble, assistant clinical professor of medicine at Harvard; Dr. Albert M. Snell, clinical professor of medicine at Stanford University and the University of California; and E. Reece Harrill, assistant administrator of the St. Lawrence Seaway Development Corporation, Messina, New York.

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Dr. JOHN ANTHONY of Stanley has purchased the practice and equipment of Dr. W. H. Knobloch at Tioga and will replace him as that town's resident physician.

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Dr. KENNETH S. HEKENBOLT, formerly of Norfolk, Virginia, has established a new urology practice in Grand Forks' Medical and Dental Building. He received his Bachelor's degree and M.D. from the University of Virginia and completed his internship and residence at the University of Minnesota Hospitals.

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Minnesota

R. LEE CLARK, JR., M.D., was installed as president of the Alumni Association of the Mayo Foundation for Medical Education and Research at the association's annual meeting in Rochester October 8. He succeeds Dr. James F. Weir of Rochester as president. Dr. Clark, director and surgeon in chief of the University of Texas M. D. Anderson Hospital and Tumor Institute in Houston, received his M.Sc. degree in surgery from the University of Minnesota Graduate School of Medicine in 1938. He was a Fellow and first assistant emergency surgeon at the Mayo Foundation for Medical Education and Research from 1935 to 1939. The Alumni Association is composed of physicians who have undertaken graduate work at the Rochester branch of the University of Minnesota School of Medicine. Organized in 1915, the association has shown progressive growth; since 1921, membership has grown from 151 to 3,227.

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DR. HARLEY C. CARLSON of Argyle, a Fellow in roentgenology of the Mayo Foundation in Rochester, received the Russell D. Carman Fellowship Award for his study, "Microangiography of Bone in the Study of Radiation Changes."

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DR. JOHN W. WORTHINGTON, a consultant in medicine at the Mayo Clinic in Rochester and a former Fellow in medicine of the Mayo Foundation, has received the Herschel V. Jones Award for superior ability in medical science.

DR. JOHN A. CULLIGAN of Minneapolis was given the E. Starr Judd Award of the Mayo Association for his thesis in surgical research entitled "Experimental Damage or Destruction by Local Anoxia of the Myenteric Plexus of the Esophagus in an Attempt to Produce Cardiospasm in Cats and Dogs."

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DR. RALPH A. NELSON of Minneapolis, a Fellow in physiology of the Mayo Foundation in Rochester, was one of three recipients of the annual award of the Alumni Association of the Mayo Foundation for his study, "The Effect of Niacin Deficiency on the Absorption of Water and Sodium from the Small Bowel of Dogs."

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DR. FREDERIC J. KOTTKE of Minneapolis has been elected president of the American Congress of Physical Medicine and Rehabilitation for 1959-60. Other officers are Dr. Donald A. Covalt, New York, president-elect; Dr. Donald J. Erickson, Rochester, Minnesota, first vice-president; Dr. Jerome S. Tobis, New York, second vice-president; Dr. Louis B. Newman, Chicago, third vice-president; Dr. Charles D. Shields, Washington, fourth vice-president; Dr. William Erdman II, Philadelphia, fifth vice-president; Dr. Frances Baker, San Mateo, California, secretary; Dr. Frank H. Krusen, Rochester, Minnesota, treasurer; Dr. Walter J. Zeiter, Cleveland, executive director; Dr. Glenn Gullickson, Jr., Minneapolis, assistant to the executive director; and Dorothea C. Augustin, Chicago, executive secretary.

(Continued on page 36A)

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¹Jorres, S. M.: *Unpublished test report from Pratt Diagnostic Clinic, New England Medical Center, Boston, Mass. (July, 1958)*

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NEWS BRIEFS

(Continued from page 35A)

DR. CYRIL TIFFT, St. Paul, is president of the Minnesota Academy of General Practice, succeeding Dr. John G. Lohmann, Pipestone. President-elect is Dr. Franklin H. Dickson, Proctor. Other officers chosen by the House of Delegates meeting during the state academy's ninth annual fall refresher course in Minneapolis include Dr. William Henry A. Watson, St. Paul, vice-president; Dr. Charles Beck, North St. Paul, secretary-treasurer; Dr. Herb L. Huffington, Waterville, speaker of the house; Dr. David Feigl, Wayzata, vice-speaker; Dr. Herman E. Drill, Hopkins, delegate to the American Academy of General Practice congress of delegates, with Dr. Robert O. Quello, Minneapolis, alternate. More than 400 physicians attended the two-day refresher.

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DR. MORRIS FISHBEIN, Chicago, spoke to the Hennepin County Academy of General Practice fall meeting to which members invited specialist colleagues. The general practitioner, Dr. Fishbein predicted, will be the major factor in health care of the future, doing a great deal of surgery and most of the obstetrical care. Better quality care at lower costs would be possible if health insurance policies would pay for laboratory and diagnostic services for ambulatory patients, Dr. Fishbein pointed out.

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DR. WILLIAM MCCONAHEY and Dr. A. Russell Hanson represented the Mayo Clinic and Foundation at the first meeting of the North Central Regional Medical Education for National Defense Institute at the University of Wisconsin.

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DR. THOMAS P. MAGATH and Dr. Charles A. Owen of the Mayo Clinic presented scientific papers at the annual meeting of the American Society of Clinical Pathologists and the College of American Pathologists in Chicago September 4 to 11.

Advertisers' Announcements

POLIO VACCINE

Large-scale experimental production and further development of the Sabin oral polio vaccine has been started by Merck & Co., Inc., Rahway, New Jersey. The program is designed to provide more than enough of the vaccine to conduct extensive clinical testing for the further establishment of the safety and efficacy of the live virus vaccine. The company also announced that it is stepping up production of the Salk vaccine in order to keep up with the current demand. In addition, the firm said, tests on a new, highly potent, purified polio vaccine of the Salk type are near completion. If these tests are successful, the company plans to apply for a license to manufacture and distribute the vaccine in 1960.

PEDIATRIC GRANTS

Grants providing for postgraduate pediatric studies will be awarded again in 1960 by Wyeth Laboratories of Philadelphia. The company will award 20 two-year grants, each carrying an annual stipend of \$2,400. Applications should be submitted by November 30, 1959, to Dr. Philip S. Barba, University of Pennsylvania School of Medicine, Philadelphia; Dr. John A. Anderson, University of Minnesota School of Medicine, Minneapolis; Dr. Amos Christie, Vanderbilt University School of Medicine, Nashville; Dr. Hugh A. Carithers, Jacksonville, Florida; or Dr. Crawford Bost, San Francisco.









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